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ON COLCHICIA.

By John M. Maisch.

Some years ago the active principle of colchicum was repeatedly made the subject of investigation with results frequently differing in the most essential particulars. Very few of these papers have found their way into American Journals, and it may therefore not be without interest to review the chemical examinations of this interesting substance which have been published within the last ten or twelve years.

Since Geiger and Hesse prepared what they stated to be an alkaloid, now more than thirty years ago (1833,) this compound had excited very little interest until this was awakened again in consequence of four fatal cases of poisoning in Berlin, by wine of colchicum seed, the forensic analyses by Schacht and Wittstock being widely circulated, and a condensed account was published in this Journal, 1855, page 539. Dr. J. Müller, apothecary of Berlin, accused in the above case of unlawful sale of poison, was found "not guilty," because Tinct. Colchici Sem. was not enumerated in the Prussian Pharmacopœia, (6 edition,) among the poisons; he published a long paper in Buchner's Neues Repertorium, 1855, page 246—268, wherein he attempts to confute the results of Schacht and Wittstock, and wherein he states, "that not only the alkaloids and active principles strychnia, hyoscyamia, daturia, emetia, atropia, solania, veratria, sabadillia, aconitia, delphinia, picrotoxin, brucia, cusparin, theina, scillitin,

but also the active principles of Convallaria polygonatum, Paris quadrifolia, Triglochin palustre, Alisma plantago, Arum maculatum, &c., even the common onion, give more or less quite the same reactions which the experts observed during their investigation."

Reithner (Wittstein's Vierteljahresschrift, iv. 481) examined the flowers of colchicum autumnale and found colchicia combined with tannin.

Professor K. Schroff, of Vienna, experimented with various parts of colchicum and with colchicia prepared by Merk, of Darmstadt, by Geiger's process; the seeds had yielded him from four to six drachms of alkaloid per hundred weight; it was a light yellow crystalline powder, possessing otherwise the properties and reactions given by Geiger, among the latter particularly the reaction by concentrated sulphuric (yellowish-brown color,) and nitric acid (violet, indigo-blue, green and yellow color,) (Oesterr. Zeitschr. f. prakt. Heilkunde, 1856; see also Amer. Journ. of Pharmacy, 1857, 324.)

In Comptes rendus, Dec., 1856, (see Am. Journ. Ph., 1857, 235,) L. Oberlin denied the existence of an alkaloid in colchicum autumnale, and announces the discovery of colchiceine $C_{35}H_{22}NO_{11}$ a neutral poisonous principle, not precipitated by tincture of galls or bichloride of platinum, nearly insoluble in water, soluble in dilute acids with yellow color, and turning yellow, violet, deep red, light red and yellow with concentrated nitric acid.

Previous to the publication of this paper, four essays had been handed in to the officers of the North German Apothecaries' Association, in answer to a prize query on colchicia, propounded for the year 1855–56. The first prize was awarded to Albrecht Aschoff, the second to Gust. Bley. The results of these investigations were reported on in Archiv der Pharmacie, 1857, Jan. 1–27. A condensed account of Aschoff's process for preparing the alkaloid from the corms is found in Parrish's Pharmacy, 2d edit. p. 414, 3d edit. 659. The cold infusion is precipitated by subacetate of lead, from the filtrate the lead is separated by carbonate of soda, the filtrate is precipitated by tannin, the precipitate washed, pressed, dissolved in alcohol, decomposed by freshly

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precipitated oxide of iron, the filtrate evaporated, dissolved in a mixture of absolute alcohol and ether, evaporated, dissolved in water and evaporated. One lb. of dry corms gathered in October yielded 6·5 grains, gathered in November 4 grains, gathered in May ·75 grains, young corms 6·5 grains.

By the same method, 2 lb. of fresh flowers with the subterranean portion attached, equal to 4½ oz. dry, yielded 7 grains, the same weight of flowers cut off above the ground, only two grains of colchicia.

The seeds were boiled with water, expressed, the decoction neutralized by lime, boiled, filtered and evaporated, the extract exhausted with alcohol, distilled, the residue extracted with water, the solution precipitated by tannin and the precipitate treated as above. Ten lb. of ripe seeds yielded 160 grains of colchicia, unripe seeds the same quantity.

G. Bley obtained much less colchicia; he exhausted by alcohol acidulated with sulphuric acid, neutralized with lime, evaporated, dissolved in water and treated the precipitate by carbonate of potassa with alcohol and animal charcoal; most of the colchicia must have remained in the mother liquor.

Hübschmann (Schweiz. Zeitschr. fur Pharm., 1857, No. 2) obtained from 100 lb. of seed half an ounce of colchicia, light yellow and amorphous, which would not neutralize the acid reaction of two drops dilute sulphuric acid.

The inaugural essay of John E. Carter "on colchicia" is printed in this Journal, 1858, p. 205–211. He prepared the alkaloid from the corms by a process similar to Aschoff's for the seeds, but used hydrated oxide of lead for decomposing the tannate, and obtained 20 grains of colchicia from 3 pounds or 6·66 grains per pound, thus agreeing with Aschoff's results.

G. E. Walz (N. Jahrbuch f. Prakt. Pharm., xvi. 1,) states that he obtained colchicia in white rhombic crystals; by boiling the aqueous solution with dilute acids colchiceine was obtained and the filtrate reduced an alkaline solution of copper.

In the following year (1862) H. Ludwig and Pfeiffer prepared impure yellowish-brown colchicia from the seed, by boiling them with alcohol, distilling, diluting with water, separating from the oil, precipitating by tannin, drying with oxide of lead, exhaust-

ing with hot alcohol, distilling, filtering and evaporating. This impure body was dissolved in water and precipitated by tannin in two fractions; the colchicia from the second fraction was less freely soluble in water. By slowly evaporating with sulphuric acid, crystallizable colchicein was obtained and the mother liquor did *not* reduce an alkaline solution of copper. Colchiceine is sparingly soluble in cold, more in hot water; the aqueous solution is colored yellow by dilute acids, violet and brown by concentrated nitric acid, precipitated by tannin, chloride of platinum, chloride of gold, nitro-picric acid, solution of iodine, and chlorine water, not by corrosive sublimate; the reactions are therefore almost identical with those of the amorphous colchicia; the alkaline nature of this body is denied; it was *almost* without action upon slightly reddened litmus paper.

M. Hübler (Jenaische Zeitsch. f. Med. u. Naturw., 1864, 247) prepared colchicia by a process similar to Ludwig's, except that the aqueous solution of the alcoholic extract was precipitated by subacetate of lead and the lead removed by phosphate of soda; colchicia was precipitated by tannin in fractions, the middle portion was decomposed by oxide of lead, and the fractional precipitation by tannin and decomposition by oxide of lead repeated until the product was of a sulphur-yellow color and soluble in alcohol and water without turbidity. It is amorphous, of a faint aromatic odor and intensely bitter taste, fusible at 140° C. (284° F.) insoluble in ether, readily soluble in water and alcohol, without action on litmus paper and produces in aqueous solution a yellow color with mineral acids and alkalies, and precipitates with chloride of gold (yellow), corrosive sublimate (white) and tannin (curdy;) not with chloride of platinum, perchloride of iron, subacetate of lead and sulphate of copper; its composition is $C_{34}H_{19}NO_{10}$. Heated with dilute sulphuric acid a resinous body and colchiceine is obtained which is removed from its aqueous solution by animal charcoal and converted into a brown uncrystallizable body, which is also formed from the solution in contact with air. It has the same composition as colchicia, has an acid reaction, decomposes the carbonates, is soluble in alkalies, and these solutions are precipitated by salts of the alkaline earths and metallic oxides; it appears also to be formed by the action of

alkalies upon colchicia and does *not* pre-exist in the seeds of colchicum. Pure colchicia in doses of ·05 grm. killed dogs, but did not affect rabbits in doses of ·1 grm.

The collection of chemicals in the Philadelphia College of Pharmacy contains a specimen of colchicia prepared by Mr. Carter in 1857; a portion of this was used for the purpose of clearing up the contradictions in the statements of the above authors. The substance is a light yellow amorphous powder, possessing a very faint odor and intensely bitter taste, sparingly soluble in ether, but easily soluble in water and alcohol, the aqueous solution being slightly turbid, most likely in consequence of the decomposition of a small portion into resin and colchicein. Heated upon platinum foil, it fuses; at a higher heat, it takes fire and burns without leaving any residue. Placed upon moistened red litmus paper, the blue color is restored; very faintly reddened litmus becomes blue also by a concentrated aqueous solution. One drop of dilute sulphuric acid dropped from a bottle giving fifty-two drops to the fluidrachm, consequently about one-eighth of a grain HO,SO_3, when mixed with one grain of colchicia, retained its acid reaction. One drop of the acid was mixed with one fluidounce of distilled water; in five minims of this mixture, equal to about one-seven hundred and seventieth grain HO,SO_3, one-sixteenth grain colchicia was dissolved and the solution now had a distinct alkaline reaction on slightly reddened litmus paper; but on heating this solution to the boiling point, it had acquired an acid reaction. It will be seen that two important statements of Mr. Carter are corroborated, namely, the alkaline reaction of colchicia and its power to destroy the acid reaction of sulphuric acid.

The behaviour of colchicia towards reagents, I found to be as described by the authors quoted above; the most important tests for recognizing the presence of colchicia, are its behaviour to dilute acids and also alkalies, by which its solution acquires a yellow color, and the violet and blue color which is produced by oxidizing agents with dry colchicia. This latter coloration, which changes through various shades finally into yellow, is strikingly beautiful when concentrated sulphuric acid is used and immediately some nitric acid or a fragment of a nitrate is added; strong

nitric acid produces it likewise, but it changes more rapidly to yellow. Sulphuric acid with a trace of chromate or bichromate of potassa, or of sesquichloride of iron, or of binoxide of lead, shows the same reaction at the point of contact with colchicia; the liquid itself has a green color with the first two reagents, owing to their intense yellow color.

One grain of colchicia was dissolved in one fluidounce of distilled water, slightly acidulated with muriatic acid; by repeated trials it required 114 drops from this vial to make one fluidrachm; this measure had been carefully gauged with a pipette graduated into $\frac{1}{100}$ CCM. In making the following experiments, a sufficient amount of the reagent was added to enough distilled water to make one fluidounce, and the solution of colchicia was carefully dropped in until, after stirring, a permanent turbidity was observable. Under these circumstances, it was required of

Mayer's iodohydrargyrate of potassium	15 drops	turbidity quite distinct.
Sonnenschein's phosphomolybdic acid	20 "	turbidity distinct.
Tannic acid	100 "	turbidity scarcely observable.

It follows from this that the following amounts of colchicia may be detected by

Mayer's test	·01645 grains	or one part in	27700 water.*
Sonnenschein's test	·02193 "	"	20778 "
Tannic acid	·10965 "	"	4156 "

Solutions of colchicia in water acidulated with sulphuric and with muriatic acid were evaporated and three times taken up by water and again evaporated; the aqueous solutions were finally filtered from the separated resin, and the filtrate slowly evaporated with an excess of carbonate of lead, the residue then treated with strong alcohol and slowly evaporated. Colchicein was obtained in yellowish crystals, which were free from acid and lead. Dissolved in water it still yields precipitates with tannin, phosphomolybdic acid and iodohydrargyrate of potassium; but neither in solution nor in substance does it produce any reaction on red or blue litmus paper. Rendered faintly alkaline by ammonia, the solution occasions precipitates with the soluble salts of barium, calcium and lead, which are soluble in dilute nitric acid. Towards acids it behaves similar to colchicia.

* One fluidounce water = 455·669 grains.

The resinous matter remaining on the filter when colchicein is filtered off was dissolved in alcohol, and the solution evaporated; an amorphous brown-greenish mass was left, in which alcoholic solution has a decided acid reaction. Concentrated nitric acid dissolves it with an evanescent yellow color; on the addition of sulphuric acid the solution takes place with a purplish-brown, rapidly disappearing; pure sulphuric acid dissolves it with a brown color.

Having looked in vain in every portion of the decomposed colchicia for glucose, or a compound which would reduce an alkaline solution of copper, the observations of Oberlin, Ludwig and Hübler are confirmed.

Taking all these results together, no doubt colchicia must be looked upon as an alkaloid, the salts of which are soluble in water, but decomposed with the formation of colchicein, on keeping them in solution as well as on evaporating them. The crystalline mass, obtained by Mr. Carter on evaporating sulphate of colchicia, was undoubtedly colchicein.

Aschoff and Bley observed already that colchicia combines with bases, and that when it is evaporated with a solution of the carbonate of an alkali, the residue contains no carbonic acid. Hübler makes it probable that colchicein is formed under these circumstances. Colchicia is a very weak base, and colchicein, if it can be regarded as an acid, is certainly a weak one, and resembles the alkaloids in its behavior to some reagents. If colchicia and colchicein have the same composition, the acid resin formed together with the latter can scarcely be different.

In preparing colchicia, the action of alkalies and acids, particularly when heat is applied, must be avoided.

Regarding the officinal preparations of colchicum, requiring the application of heat, the two fluid extracts must contain colchicia in its natural state of combination; extractum colchici aceticum, however, contains colchicein. It would be interesting to ascertain how long colchicia is found in the officinal wines before it is partly or entirely converted into colchicein; the similarity of their reactions will increase the difficulties of their separation without farther decomposition of the alkaloid, while it facilitates the discovery of colchicum in cases of poisoning.

Aschoff proved its presence in the stomach, heart, lungs, kidneys and blood of a cat which had been killed by 1½ grains colchicia.

SOLUTION OF MECONATE OF MORPHIA.

By William Procter, Jr.

A preparation has long been known and used in England under the name of "Solution of bi-meconate of morphia," with the impression that it possessed decided merit in a therapeutic point of view, from being the *natural* salt of morphia as it exists in the poppy. Until recently this has been considered to be meconate alone, but in 1862 Messrs. T. & H. Smith, of Edinburgh, discovered a peculiar acid as a constant ingredient of opium, which they submitted to Dr. Stenhouse for analysis, who pronounced it identical in composition with *lactic acid;* yet its relations to bases prove it to be isomeric only, and they gave it the name of *thebolactic* acid. These chemists have ascertained it to be as constantly present, and as regular in quantity, as any other of the well-marked normal constituents of opium,—they having examined twenty different lots of opium, and prepared as much as one hundred pounds of thebolactate of lime. They also found it to be present in the proportion of about two per cent., and they believe it to exist naturally in union with the morphia and perhaps other alkalies. It follows, from this information, that meconate of morphia only partially represents the natural condition of that alkaloid, and to be pertect it should be meconate and thebolactate combined.

The original preparation, as imported, is evidently not a solution of the pure salt, as there is both color and odor, though not much of the latter. So far as I remember no process for it has appeared in print; the one employed by Powers & Weightman, and Parrish, was suggested by Edward S. Wayne, of Cincinnati, and is said to consist in precipitating the meconic acid as a lead salt, separating the lead by hydrosulphuric acid, precipitating the morphia from the filtrate and washings of the lead precipitate, re-uniting the impure meconic acid and morphia thus obtained, and diluting the solution to the strength of laudanum, using a portion of alcohol.

If it be desirable to represent the thebolactic acid in this solution, it will be necessary to prepare the acid by a separate process, as this acid is not precipitated by acetate of lead or ammonia. The proportion of meconic acid in opium, according to the best authorities, is about 5 per cent.; that of thebolactic acid 2 per cent. (*See Amer. Jour. Pharm. for* 1865, p. 466.)

In glancing over the meconates, with a view to the selection of one that would render the use of sulphuretted hydrogen unnecessary, I concluded to try the baryta salt, as recommended by Couerbe, for the preparation of meconic acid. This consists in making a solution from the opium in powder, with alcohol 90°, precipitating this with powdered chloride of barium in excess, observing accurately the quantity used, separating the precipitate, washing it with strong alcohol, mixing it with hot water, and adding a quantity of sulphuric acid, properly diluted, equivalent to the baryta present, filtering the liquid while hot to avoid loss of meconic acid by cooling. The alcoholic morphia liquid was then distilled to recover the alcohol, treated with water, filtered, half its bulk of the recovered alcohol added, precipitated by ammonia, allowed to stand until the impure morphia had separated, and this collected and washed, added to the meconic acid, dissolved by a gentle heat, and filtered.

This process cannot be recommended, however, for the shop, as it involves too much nicety of manipulation in adding and separating the baryta, occupies too much time, and retains the opium odor more firmly, unless the alcoholic extract be dried and re-dissolved by water before precipitating the morphia.

The following working process is therefore suggested as more eligible for the apothecary, and as being less complicated:

Take of Opium in powder (or dry enough to powder), 5 troyounces,
Stronger Alcohol (95 per cent.), a pint,
Distilled Water,
Water,
Acetate of Lead,
Water of ammonia, of each a sufficient quantity,
Ingredients for generating sulphuretted hydrogen, a sufficient quantity.

Macerate the opium in a pint of water with agitation for three days, strain with expression, and again macerate in successive portions of water, a pint each time, for twenty-four hours, until four pints have been used and the opium sufficiently exhausted. Evaporate the liquors carefully to the measure of a pint, filter, and add solution of acetate of lead until it ceases to produce a precipitate. Collect this on a filter, wash it with water thoroughly, suspend it in a pint of warm distilled water, pass a current of sulphuretted hydrogen through the mixture until the lead is entirely precipitated, heat and filter the solution of meconic acid that remains, until deprived of sulphuretted odor. Meanwhile take the liquid filtered from the lead precipitate (containing the morphia, etc.), together with the washings, evaporate them at a gentle heat to four fluidounces; drop in sufficient diluted sulphuric acid to precipitate the oxide of lead present, and filter; then mix the filtrate with an equal bulk of alcohol and carefully add the solution of ammonia, with agitation, until it remains in slight excess; allowing it to rest twenty-four hours, that the morphia may separate. Collect the impure morphia on a filter, wash it with a little water, and dissolve it in the hot solution of meconic acid and filter if necessary, washing the filter with a little distilled water. Finally, add first sufficient distilled water to the filtrate to make it measure three pints, and then the stronger alcohol, and mix them.

Thus made, solution of meconate of morphia has a decided bitter taste, but little odor except from the alcohol present, and a light reddish-brown color, varying in different specimens, and due to adhering coloring matter, and especially to contact with oxide of iron during preparation in filters or utensils.

I have given the details explicitly, to enable the apothecary to make the preparation when not in reach of the manufacturer, as the process is too tedious and troublesome to be resorted to for the supply of a small demand, except from necessity.

The writer believes it to possess no merit not embraced in the officinal "deodorized tincture of opium" and the "liquor opii compositus" of Dr. Squibb, and offers the process for use when needed, rather than to create a demand by recommending so costly a substitute for sulphate of morphia.

PHARMACEUTICAL NOTES.

By Albert E. Ebert.

Bi-Bromide of Mercury.—Having lately had some demand for bi-bromide of mercury, and not being able to obtain the salt in market, it became necessary to prepare it. After many trials with different formulas which were at command I devised the following process, which recommends itself for simplicity and cheapness, and which enables the dispensing pharmacist to make it expeditiously, should occasion require it.

Take of Bromide of Potassium 240 grains.

Solution of Nitrate of Mercury (U. S. P.) 510 grains, or ℥ss.

Distilled Water a sufficient quantity.

Dissolve the bromide of potassium in two fluidounces of water, and add, with stirring, the solution of nitrate of mercury. Set it by for a few minutes, so that the precipitate may subside. Pour off the supernatant liquid, and wash the precipitate with water until the presence of nitrate of potassa in the washings is no longer indicated by appropriate tests. (This is best determined by boiling a portion of the washings, previously treated with a few drops of *pure* sulphuric acid, and rendered slightly blue with sulphate of indigo. If the color remains, no nitric acid is present.) Transfer the still moist precipitate to a glass flask, add twelve fluidounces of distilled water, and heat to the boiling point, or until the precipitate is dissolved. Now pour the solution, while still hot, on a paper filter, and set the filtrate aside to crystallize. Lastly, drain the crystals, and dry them on bibulous paper. It is sparingly soluble in cold water, requiring 240 to 250 parts for solution (Storer's Dict.); while at the boiling point it is dissolved by 25 parts of water. It is quite soluble in glycerin and oil of turpentine, and very soluble in alcohol and ether. The dose is similar to that of corrosive chloride of mercury, from $\frac{1}{16}$ to $\frac{1}{4}$ of a grain.

Wheat Phosphates.—A dietetic preparation under this name was brought to the notice of the medical profession by Dr. Tilburn Fox (*Med. Times and Gaz.*, March, 1866). In the paper alluded to the author says: "The various forms of infants' food

are, in the great majority of instances, simply and purely starch. Now, inasmuch as the starchy element is not the assimilative nor the flesh-forming, but the heat and fat producing principle, all our past efforts in securing a nice white flour have been antagonistic to the possession of nutritive material, and actually the very desirable part of the grain, contained in the *bran*, viz., the organized phosphates and other principles have been deliberately rejected." He claims that "the organized phosphates aid the assimilative function, and promote digestion." To obtain these *organized phosphates* he recommends "that a decoction be made of *bran*, evaporated, mixed with sugar, and reduced to powder." The ideas advanced by Dr. Fox have met with much favor from physicians whose frequent inquiries induced me to supply the wheat phosphates. Those who have made trial of the compound give satisfactory report of its usefulness, and regard it as a valuable dietetic. A very considerable experience in the manufacture of this article enables me to offer a few practical suggestions in relation to its preparation.

Wheat Phosphates.

Take of Wheat Bran (free from dust) ℥xvj.
Water Ovj.
Sugar a sufficient quantity.

Boil down to four pints (being careful not to burn it), and strain while hot with pressure. Transfer to a water bath, and evaporate as quickly as possible, with stirring, until it has acquired the consistence of an extract. If the evaporation is slow, and the liquid is exposed a considerable time to the action of the atmosphere, it is liable te undergo a change, and acquire a sour taste. When this extractive consistence has been reached, however, it does not require further care. Allow it to dessicate slowly, by the heat of a water bath, to a pulverizable mass. Reduce this to a very fine powder, and mix it with pulverized sugar in the proportion of 1 part of wheat phosphates to 3 parts of sugar. The mixture should be passed through a very fine sieve. The average yield of wheat phosphates from sixteen troy ounces of bran is four troy ounces, which mixed with 3 parts of sugar represents the original quantity of bran used. It is especially

recommended for young children in whom the assimilative function is at fault. It may be used in place of sugar, a teaspoonful being added two or three times a day to the child's food.

Chicago, Illinois.

NOTE ON TESTING GLYCERIN FOR SUGAR AND GLUCOSE.

By the Editor.

The *Druggist's Circular* for January (page 9) has a communication from a correspondent, A. C. Pope, relative to the purity of commercial glycerin, which attracted our attention by the assertion of his inability to find any pure glycerin, notwithstanding some of the best kinds were instanced as having been tried. The loose and imperfect manner in which the alleged testing was applied lead to strong doubts of the correctness of the results, and especially those by Trommer's test for glucose, but the statement was so straightforward and unhesitating that it was calculated to challenge belief, and shake the faith of some in the best product of our markets. Until Bower's bottled glycerin was introduced, we had clung to Price's as the only perfect product obtainable, but since the former was fairly tried we have believed it to be equal in all respects to Price's. When, therefore, we read the statement of Mr. Pope we at once subjected the glycerin of the manufacture of Mr. Bower to Trommer's test for glucose and to tests for lime and chlorine, and found it wholly free from these impurities and from odor when warmed. We then tried the Vienna glycerin, made by F. A. Sarg, and found it entirely free from sugar and lime, but it was clouded by nitrate of silver, due most probably to some chloride present, and when heated it had a faint odor, not observed when cold. Two other American glycerins, Eckstein & Co. and Hennell Stevens, were tried for sugar only with equally negative results. The action of Trommer's test for glucose is so unequivocal and well marked in the presence of glycerin that no doubt need be felt by the experimenter; the reduction of the oxide of copper on boiling being manifest by its brick dust color, when even in small quantity. But as glucose would not be used as an adulterant in less than 5 or 10 per cent., with profit equal to the risk of dis-

covery, there need be no better test used, pure glycerin not reducing the cupric oxide.

Mr. Pope appears to have been deceived by the deep blue color which the mixture acquires after the contact of the alkali. This coloration is a quality of glycerin due to its solvent power on the cupric oxide. According to A. Vogel (Gmelin, vol. ix. 490), cupric sulphate mixed with glycerin forms a clear azure blue mixture, with an excess of potassa." "Where the potassa is in smaller quantity a precipitate occurs, but this is soluble by heat and a further addition of potassa; the resulting blue solution decomposes below 212°, depositing a flaky precipitate."

In speaking of Vienna glycerin Mr. Pope says, "however, upon boiling I failed to get the precipitate of suboxide of copper," an admission at once clearing the sample tested from the suspicion of glucose.

As cane sugar syrup may be used as an adulterant, its presence may most satisfactorily be detected by diluting a little of the suspected glycerin with three parts of water, adding a few grains of tartaric acid, and boiling a few moments. Then add the solution of sulphate of copper, followed by the potassa, when the reddish suboxide will at once appear if cane sugar had been present, the tartaric acid having changed the cane sugar into glucose.

The editor of the *Circular*, in commenting on Mr. Pope's remarks, among other things observes, "Another method of detecting sugar in glycerin is by means of *chloroform*, in which glycerin dissolves readily whilst sugar is quite insoluble. The liquid [glycerin] is first heated to drive off the water it contains, then mixed with chloroform. The whole is then poured on a tared filter and repeatedly washed with chloroform, after which the filter and its contents are dried at 212° F., and weighed.

By reference to the U. S. Dispensatory, 12th Edit. p. 420, the same idea is suggested, credited to the *Chemical News* (1863, vol. viii. p. 227). This method is defective from the fact that *commercial glycerin is insoluble in chloroform*, and consequently sugar may be present without being detected by this means. We have tried samples of four different manufacturers, and all are equally insoluble in chloroform. Singularly enough the most recent works on chemistry and pharmacy do not allude to

the relations of glycerin to chloroform as regards solubility: neither Gmelin, Brand & Taylor, Gregory, Storer's Dictionary of Solubilities, nor Parrish's Pharmacy, allude to the matter. Dr. Adolphus (see p. 150 of this number) says that glycerin is insoluble in chloroform. We believe, therefore, that this "test" will have to be set aside.

NOTE ON NARCEIA.

By the Editor.

The publication of the results of M. Liné on the physiological powers of narceia (see this journal, Sept., 1866, page 454), and other journals, seems to have attracted the attention of physicians to this ingredient of opium. It has not been considered as possessing much therapeutic interest. Dr. Wood states, in the U. S. Dispensatory (page 623, 12th Edit.), that two grains were introduced into the jugular vein of a dog without observable effect. M. Claude Bernard (*Comptes Rendus*, and this journal, for 1865, page 70) seems to have first called attention to the individual therapeutic character of the alkaloids of opium, and especially to the eminent soporific effects of narceia. According to these experiments the animal sleeps more profoundly, but is not so much stupified, as with morphia, nor so much excited as by codeia. The immense price of this alkaloid (96 dollars per ounce) will prevent its use in a general way, being twelve times the price of morphia. This is mainly the result of its scarcity, as until this time narceia has been thrown away in the liquors from which morphia was extracted, being soluble in alkaline solutions. Nevertheless, according to Couerbe, forty pounds of opium, which yield fifty ounces of morphia, afford but six drachms of narceia; yet when it is considered that thousands of pounds of opium have been and are annually treated for morphia, it must be apparent that if the residual principles had been collected, as those of bark have been, narceia would have been less expensive, and it is quite probable that the price will abate.

The manner of using narceia may be in pills or solution; its solubility varies much from that of morphia, and its relation to acids is quite different. According to M. Hesse (Amer. Jour.

Pharm. xxxviii., 472), it requires 1285 parts of cold water, 945 parts of alcohol of 80 per cent., and 800 parts of diluted acetic acid to dissolve it. Liebig gives its solubility in cold water at 375. Acetic acid is not a good solvent for narceia; in fact the acetate of narceia, like the acetate of quinia, is quite insoluble, and is instantly precipitated by mixing solution of acetate of ammonia with solution of hydrochlorate of narceia. The narceia should be triturated with a little water before adding the muriatic acid, because the concentrated acid decomposes this alkali and colors it blue, this being a well-marked test of narceia, and by gently heating after the acid is added the alkali is dissolved and retained in solution, whilst when heated alone in 200 parts of water it dissolves, but on cooling nearly the whole crystallizes out in bulky acicular crystals.

Narceia, according to Couerbe (Gmelin Handb. xvi., 420), is best obtained from the black, dense, mother liquor left after crystallizing out the muriates of morphia and codeia in Gregory's process for morphia. This liquor is evaporated to a syrupy consistence, diluted with water, acidulated with HCl, and allowed to cool, when a matter like ulmin separates and rises to the surface. This is filtered and rendered alkaline by ammonia, which precipitates morphia and thebain as a black precipitate. The liquor filtered is evaporated to a thin syrup, and shaken repeatedly with ether, which renoves opianyl. The remaining black liquid, on standing, solidifies to a crystalline mass; the crystals, being narceia, are washed with cold water, collected on paper, pressed, dried, and re-crystallized from alcohol.

NOTE ON SOLUTION OF CITRATE OF MAGNESIA.

EDITOR AMERICAN JOURNAL OF PHARMACY.

Sir,—From the number of communications published in the Journal of Pharmacy in regard to the preparation of *Liquor Magnesiæ Citratis*, I conclude that the following formula, given to me by a former Assistant, Mr. Jas. A. Criswell, of Woodville, Miss., may be of value to some of your readers; I have been preparing it for some time in this way and have never seen any precipitate, nor heard any complaint of its effects from my custo-

mers. Should you think it of sufficient value you can give it a place in your Journal. Prof. Parrish, in his work on Pharmacy, (page 405) says, "if carb. magnesia were used to liberate the gas, the tendency to deposit would be increased," &c., such is certainly not the case with this preparation.

℞	Magnesiæ carbonatis	℥iii.
	Acidi citrici	℥vi.
	Aquæ puræ	Ov.
	Syrupi simplicis	Oi.
	Ext. limon, q. s.	
	Potass. bicarb., q. s.	

Dissolve the acid in the water, add the carb. magnesia and stir occasionally until dissolved; filter the solution and add the syrup and ext. lemon. Agitate until well mixed and put into eight 12 oz. bottles, add 40 grs. bicarb. potass. to each bottle and cork immediately.

Yours truly,

JOHN T. BUCK.

Jackson, Miss., Jan. 25th, 1867.

NOTE ON "TINCTURA LYCOPERDON."

BY THE EDITOR.

Dr. B. W. Richardson, of London, appears to have been the introducer of the dusty powder from Lycoperdon bovista, (known as puff-balls—devils snuff box, etc.,) as a remedial agent. This mushroom is said to be poisonous. When the dried fungus is broken, the pulverulent particles are easily blown away by a puff of wind, and are said to possess anæsthetic properties when inhaled by animals.

Dr. Richardson (Medical Times and Gazette, June, 1853, 610) having noticed the use of this dust to stupify bees, he tried the fumes on other animals and upon himself, experiencing symptoms of intoxication and drowsiness, and causing complete anæsthesia in animals, so that they evinced no pain when operated upon.

Recently this substance has been used in Philadelphia as a tincture by Dr. Adinell Hewson, and perhaps by others in cases of nervous disease.

The following recipe, given us by Mr. John Cramer, of this city, is the form most employed.

Take of Lycoperdon bovista, four troy ounces.
Boiling water, four fluid ounces.
Stronger alcohol, twelve fluid ounces.

Macerate the powder in the water for twenty-four hours, then add the alcohol, and having mixed them by agitation, macerate for a week. The time may be shortened by percolation. Thus made, this tincture is a dark-reddish brown transparent liquid, of which the dose for an adult is a teaspoonful.

A CONTRIBUTION TO THE STATISTICS OF DRUG POWDERING.

By Thomas J. Covell, of Brooklyn, N. Y.

The following table exhibits the principal results of a small business done in powdering drugs for druggists, during the past year or more, at a mill where much care is taken to ensure the best practical results.

The drugs were all of fair quality. No mixing or substitution was practised, and in preparing, drying and powdering, due care was taken to avoid as much as possible injury to the medicinal properties of the drugs, by heating and other bad management too common in this business.

No bad or sophisticated drugs of any kind were ground, nor were any lots admitted to the drying table whose condition of dryness or moisture is very uncommon in the markets; the aim being to present a fair statement of what the average results are in articles of fair merchantable quality.

Such articles as ergot, myrrh, valerian, etc., and the classes they represent, were always powdered under protest, and with a clear statement to the owners of the deterioration which is inevitable in such articles when powdered. Such drugs as cubebs, ergot and oily substances in general, were refused when required in powder so fine as to require drying of the drug; the coarser powders in such articles being always the best, other things being equal.

The table is in two divisions of four columns each. The first

division gives the invoice neat weights and the results thereon. It is well known that commercial usage rarely obtains a very accurate weighing of drugs in the market. Gross weights are handed down through jobbers and brokers, often without verification, from the time the article leaves the ship or manufactory until it is received at the mill; during which time it may have been stored in damp or in dry places, and thus have changed in weight. Again tares are rarely accessible in the markets, but are taken from original markings on the packages, from conversion of foreign weights, or percentage allowance. As these usages are what the druggist has to abide by, they are always obtained as carefully as possible, and the losses calculated upon them, since, in cases where the weights cannot be corrected, or where actual weights are not stipulated for in purchasing, these are the data upon which the druggist must make up his cost price of the powders.

The second division of four columns shows the actual neat weights, of the drugs at the time of receiving them at the mill, and the loss calculated upon this weight. It will be seen that articles which contain but little moisture, and therefore lose little by drying, as gum arabic, catechu, gamboge, and even ipecac and rhubarb, show small losses; and these losses are suffered chiefly in cleaning the mills and putting up the powders in small packages, as 25 pound boxes; when each weighing upon any ordinary scale, takes about two ounces to turn the scale. If such losses, which are common of course to all articles, be subtracted from others where moisture occurs, the remainder will show the excess of moisture for such articles.

In the single article of aloes, every package is melted, thinned with water if required, and strained through a sieve of 60 meshes to the linear inch, the amount of sticks, stones, sand, shreds of aloe plant, pieces of goat skin, etc., thus strained out varies very much; in rare cases amounting to 31 per cent., and again falling as low as 2 per cent., and often averaging as much as eight per cent. This of course very much increases the usual loss, and many druggists will not submit to it, and such have always been desired to take their goods to other mills.

For some comparative results, a table of losses in France will

be found in volume 1 of this Journal, and also on page 31, vol. 21, of losses in England; although of early date, comparison shows that great improvements have been made in apparatus as well as in the manipulation.

DRUG POWDERING.

"The weights and percentages are expressed in avoirdupois pounds."	Invoice neat weights and the losses calculated thereon.				Actual neat weights and the losses calculated thereon.			
DRUGS POWDERED.	Aggregate invoice neat weights.	Greatest loss p. ct. on any single lot.	Smallest loss p. ct. on any single lot.	Average loss per cent.	Aggregate actual neat weights.	Greatest loss p. ct. on any single lot.	Smallest loss p. ct. on any single lot.	Average loss per cent.
Acacia	6667	2·64	0·00	0·94	6955	1·88	0·40	0·83
Acacia granulated	372	1·67	0·70	1·19	373	1·67	1·03	1·35
Aloe capensis	3382	19·31	3·34	10·08	3441	19·31	7·09	11·13
Aloe socotrina	12737	24·62	10·00	17·31	12737	24·62	10·00	17·31
Acidum tartaricum	21330	2·50	0·00	1·30	21303	2·50	0·54	1·06
Buchu	325	4·67	0·00	2·12	325	4·10	0·20	2·00
Canella	623	3·07	0·91	1·66	623	3·07	0·50	1·77
Cantharis	5289	6·22	0·00	1·94	5320	6·22	0·63	2·05
Cardamomum	154	7·10	5·00	6·02	154	7·10	5·00	6·02
Cassia	477	7.05	2·58	5·50	466	2·90	2·26	2·61
Catechu	338	1·67	0·47	1·07	338	1·30	0·86	1·08
Cinchona flava	2053	4·30	1·50	3·01	2044	3·75	1·18	2 57
Cinchona pallida	215	2·36	0·00	1·56	216	2·22	0·96	1·73
Cinchona rubra	722	5·44	0·00	2·51	718	1·72	1·24	1·58
Cubeba ground	1549	3·65	2·42	3·07	1543	3·55	1·99	2·4
Ergota ground	1144	5·50	0·00	2·95	1149	5·72	0·00	3·62
Ext. glycyrrhiza	1481	13·43	8·14	10·63	1478	13·06	8·14	10·45
Gambogia	3071	9·37	0·00	1·94	3054	2·46	0·74	1·35
Gentiana	2048	12·20	10·19	11·00	2035	11·79	9·20	10.23
Gentiana ground	3560	8·84	3·81	5·89	3532	8·30	1·56	5·09
Ipecacuanha	6935	5·53	0·00	2·17	6920	3 66	0·64	1·91
Iris florentina	1022	9·30	1·60	6·64	1018	9·00	1·10	6·22
Jalapa	8894	13·12	2·67	9·93	8864	12·24	2·95	9·58
Myrrha	422	9·54	1·66	6·74	412	8·81	3·59	5·80
Opium	6354	29·00	10·25	19·80	6360	22·25	9·91	19·61
Podophyllum	279	1·15	0·49	0·75	279	1·15	0·49	0·75
Potassa chloras	694	2·57	1·22	1·74	694	2·70	1·52	2·01
Potassa bitartras	94989	1·11	0·00	0·38	94998	1·11	0·05	0·38
Pulv. ipecac comp	300	1·63	0·38	0 88	301	1·63	0·63	1·05
Rheum	5431	6·00	0·20	2·06	5412	3·40	0·10	1·74
Saccharum lactis	645	1·27	0 26	0·74	644	0·85	0·70	0·78
Sapo	303	18·05	11 70	15·92	303	18·05	11·70	15·92
Sarsaparilla rio negro	338	8·11	0·00	3·02	322	0 96	0·35	0·70
Scammonium	168	6·00	1·25	2·78	168	5·65	1·33	2·70
Scilla	484	16 30	10·51	13·50	485	16·45	10·83	13·66
Valeriana	230	1·75	1·45	1·60	228	1·51	1·45	1·48
Tragacantha	200	7·38	6·31	6·85	200	7·38	6·47	6·93
Zingiber nigra	674	3·13	2·86	2 99	678	3·72	3·13	3·43
Zingiber alba	917	11·20	8·94	9·69	917	11·74	8·57	9·70

ON TESTS FOR THE PURITY OF GLYCERIN.

By J. M. Maisch.

The application of Trommer's test for the detection of glucose and allied carbohydrates is so frequently made, that every pharmaceutist might be supposed to be familiar with it; it consists simply in adding to the liquid to be tested a little solution of sulphate of copper and then caustic potassa or soda, until the precipitate at first appearing is redissolved; the mixture is gradually heated to the boiling point, when it becomes turbid and changes its color to yellow and red, if grape sugar, &c., is present. This reduction to suboxide of copper does not take place at the ordinary temperature.

The "Druggists' Circular," for January, contained a communication on "sugar in glycerin," sulphate of copper and potassa being used as the test. Yet, though boiling was resorted to only in one instance, resulting in a failure to get the precipitated suboxide of copper, it was endorsed as "Trommer's test," and as evidence of the presence of glucose. To any one conversant with the manipulation, the "pale tint," "intense blue color" and "particles like flock of wool," spoken of in the communication, will readily explain themselves.

The February number of the "Druggists' Circular" states that the inferences of that communication were incorrect, so far as Bower's Glycerin is concerned, while it is evident that *all* inferences are incorrect. But Dr. Newton further states that "the tests usually applied will lead to a false estimate of its (Bower's or all glycerin?) quality;" the tests, however, are n t named.

This statement, if correct, would upset all the researches made thus far on testing for the purity of glycerin. To ascertain the correctness of this assertion, four samples of glycerin were examined, namely: 1, "Vienna" glycerin, bearing the label of F. A. Sarg; 2, Bower's glycerin, recently obtained; 3, the same, which had been on hand about two and a half years; 4, glycerin manufactured in the West. The last was at least thirty months old; when first received, it was colorless and possessed a slight rancid odor; now it is of a pale amber color and its odor is very strong. Nos. 1, 2 and 3 are colorless, 2 and 3 bland and inodorous. No. 1 has a slight rancid odor, which be-

comes rather strong on rubbing it between the hands, particularly near the fire. The specific gravity at 63° F. was 1·252 of No. 1, 1·253 of No. 2, 1·250 of No. 3 and 1·241 of No. 4.

No. 4, when diluted, caused precipitates with several reagents and was set aside. The other samples were subjected to the same tests, under precisely the same conditions. Half a fluid-ounce of each was diluted with sufficient distilled and perfectly pure water to make five fluid-ounces.

Blue and red litmus paper was not affected. With sulphuretted hydrogen and sulphide of ammonium, they remained unchanged; the addition of a trace of solution of acetate of lead caused a brown coloration.

Subacetate of lead, unchanged; the addition of a little soap, tannin or sulphuric acid produced a turbidity.

Chloride of calcium, no change; a minute quantity of oxalate of soda rendered the liquid turbid.

Ferrocyanide of potassium, undisturbed; a trace of proto-sulphate of iron yielded a bluish color.

Oxalate of soda, unchanged with 2 and 3; No. 1 produced a very slight deposit on the side of the test tube after rubbing it with a glass rod; on the addition of a little chloride of calcium, a white turbidity was instantaneously produced.

Nitrate of baryta, precisely as in the foregoing experiment; a white turbidity was occasioned by dilute sulphate of soda.

Alkaline solution of copper had no effect on boiling; after the addition of a trace of honey, and boiling, red suboxide of copper was precipitated.

Akaline solution of bismuth, on boiling, produced no change; but boiling with a little honey, yielded a black precipitate.

Nitrate of silver had no effect on Nos. 2 and 3, either in the cold or on heating it to the boiling point. With No. 1, a white turbidity was occasioned, and when heated to boiling, a black precipitate was thrown down and the liquid, though transparent, was of a blackish brown color. No. 4 yielded at once a dense turbidity and soon a white precipitate; after heating to boiling, the latter was of a grey color, while the supernatant liquid had acquired a fine rose color. The white turbidity in Nos. 1 and 4 was not removed by nitric acid, but ammonia rendered the liquid clear.

A portion of Nos. 1, 2 and 3 was incinerated in a platinum vessel; the last two left a scarcely observable residue of fixed substances. The fixed residue from No. 1 was more apparent, larger in bulk, but small enough to be of no consequence in an otherwise unobjectionable preparation.

Undiluted glycerin, Nos. 1, 2 and 3, mixed with twice the bulk of 95 per cent. alcohol, yielded clear mixtures; a few drops of sulphate of soda or gum water rendered them turbid.

The original samples, 1, 2 and 3, mixed with twice the bulk of pure concentrated sulphuric acid, produced clear mixtures without change of color; a single drop of simple syrup added to them (glycerin about half a fluidrachm) instantly changed the color to brown, deepening in a minute to brown black, whereby the liquid lost its transparency. A drop of gum water added to the mixture of sulphuric acid and glycerin, after it had been standing for several minutes, re-acted very slowly; but if previously mixed with the glycerin, the addition of two volumes of sulphuric acid instantly caused a brown color, which rapidly deepened to a very dark reddish brown.

These experiments prove that minute quantities of inorganic substances, and likewise all the organic compounds which are likely to be used to adulterate glycerin, can be very readily detected by applying the necessary tests intelligently, and that they will give a correct estimate of its purity.

I have seen a circular regarding the "Vienna" glycerin, which stated that it was equalled only by Price's glycerin. Striking out the little word "only" I subscribe to this with this addition, that Price's even far surpasses this new article, if I can rely on a series of similar experiments made with it some eight or ten years ago; and with this farther addition, that Bower's glycerin ranks with the best in our market, and that I prefer it even to Price's, because, as far as I may judge from my individual conceptions, it is almost absolutely bland to the taste, while Price's leaves a sense of acrimony in the throat.

I should regard a glycerin as unobjectionable for medicinal purposes, if it forms a colorless mixture with twice its volume of strong alcohol and of sulphuric acid; and if, after previous dilution with distilled water, it yields no turbidity, either cold or on

heating to the boiling point with sulphuretted hydrogen, ferrocyanide of potassium, nitrate of baryta, oxalate of ammonia, or nitrate of silver. This last test I regard as an important one, since I believe that all those compounds, which impart to common glycerin a peculiar rancid odor, will reduce the silver salt and impart a color to the liquid on boiling, even though that odor may be scarcely apparent, while pure glycerin is not affected by boiling with nitrate of silver, although, like nearly all organic and many inorganic compounds, it gradually assumes a darker color on exposure to light.

PHARMACEUTICAL ITEMS.

By William C. Bakes.

Glycerole of Sumach.

With a view of supplying a want for an eligible and permanent preparation of sumach berries, I have adopted the following formula, which yields a preparation possessing in a pleasant and concentrated form the astringent and refrigerant properties of the berries.

Take of Sumach berries sixteen ounces.
Boiling water three pints.

Macerate for one hour and express, and to the dregs add two additional pints of boiling water and proceed as before. Mix the infusions and evaporate to eight fluid-ounces, and add glycerine to make the whole measure sixteen fluid-ounces, and filter through paper.

Elixir of Bismuth.

Inquiries having been made for a preparation by this name, and finding no established formula, I have suggested a very simple combination which seems to answer a good purpose.

Take of Solution of ammonio citrate of bismuth 12 fluidounces.
Curaçoa cordial 4 "

The Curaçoa imparts to the preparation a very pleasant flavor, and will be found a valuable adjuvant in the administration of this favorite remedy.

Iodided Opodeldoc.

This preparation, though known for a number of years, has not

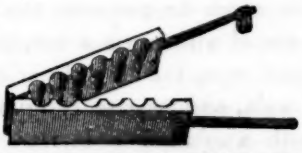
received the attention it merits, and with a view of bringing it more to the notice of the profession, I give the formula.

Take of Iodide of Potassium eight troyounces.
Alcohol, 30° Baumé, two pints.
Mix the above and form a perfect solution.
Animal soap finely shaved fourteen troyounces.
Alcohol, 30° Baumé, two pints.

Dissolve the soap in the alcohol in a flask over a sand bath; when dissolved mix the two solutions and add

Oil of garden lavender two drachms.

This is usually dispensed in one or two ounce wide mouth vials, which should be filled while the opodeldoc is warm and in a fluid condition; when cold it forms a translucent mass, melting at the temperature of the body, and as an external application, possessing many advantages over the ointment of iodide of potassium.



ON A NEW SUPPOSITORY MOULD.

Messrs. Bullock & Crenshaw, of Philadelphia, have gotten up a new and convenient mould for making Suppositories. The cut shows the form of the mould, which is constructed of brass. The instrument opens on a hinge at one end; a pin and hole at the opposite end secures proper adjustment of the two surfaces, which are accurately ground to each other, and form six perfectly smooth matrices. A sliding ring on the handles, which are set at a slight angle to each other, forms a sufficient clamp to retain the melted material.

In using the mould, they heat the material only to the point of liquefaction, and pour it into the matrices, (which should be previously rubbed with a little olive oil on cotton or wash leather); the mould is then placed in cold water until the material has solidified. To remove the suppositories, plunge the mould for an instant into water warmed to about 100° F., then open it, and, by

carefully pressing with the finger against the large end of each casting, it is discharged from the matrice. They use pure butter of cocoa as the basis during the winter months—for warm weather, the addition of from one-sixteenth to one-twentieth of *paraffin* gives a good consistency. (Paraffin is better than wax.)

To incorporate extractive matter with the butter of cocoa, they rub the extract to a thin paste with alcohol, then add sufficient butter of cocoa to form a powder, incorporate this with the remainder of the butter of cocoa, in a semifluid condition, and form the suppositories by casting.

On inquiry, we find that this mould may be obtained of Messrs. B. & C. for the sum of five dollars.

ON RHŒADINA.

By O. Hesse.

A peculiar alkaloid was found by the author in all parts of Papaver Rhœas, for which he proposes the name of rhœadina. The plant is exhausted with warm water, the infusion concentrated at a moderate heat, the slightly acid extract is treated with carbonate of soda, and repeatedly agitated with ether; the ether is shaken with a solution of bitartrate of soda, and this liquid precipitated by ammonia. The greyish white voluminous precipitate soon becomes dense and crystalline, is washed with cold water, dried and boiled with alcohol, which removes coloring matter, and another alkaloid, present only in small quantity, apparently thebaina. To obtain it pure, the alkaloid is combined with acetic acid, treated with animal charcoal, and precipitated by ammonia.

Rhœadina crystallizes in small white prisms which are almost insoluble in ether, benzine, chloroform, alcohol, water, ammonia, carbonate of soda and lime-water. At 18° C., it requires 1280 parts ether for solution. Like its solutions in acids, it is tasteless, and not poisonous. Its composition is $C_{42}H_{21}NO_{12}$. It fuses at 232° C., becomes brown, while another portion sublimes. It sublimes best in a current of carbonic acid.

Dilute acids, if not in excess, produce with the alkaloid colorless solutions in the cold; muriatic and sulphuric acid of moder-

ate concentration dissolve it at once, with a purple color. This solution becomes colorless by alkalies, but purple again on the addition of acids. One part of the alkaloid, yielding only about 5 per cent. coloring matter, produces, with 10,000 parts water, a purple, with 20,000, an intense rose, and with 800,000, a perceptible red color, equal to one part of the coloring matter in sixteen millions parts of water.

By this delicate reaction, rhœadina can be detected in all parts of Papaver Rhœas, in the ripe capsules of Papaver somniferum, and in opium. The aqueous infusion of opium is precipitated by carbonate of soda or lime, the filtrate treated with ether, and the ether agitated with water acidulated with muriatic acid. This solution acquires the color, particularly on heating. A portion of the rhœadina remains with the precipitate, and may be detected in the same manner. Merck's porphyroxyn contains less than one part of this alkaloid.

Concentrated sulphuric acid dissolves rhœadina with olive green, nitric acid, with yellow color.

The colorless solution in muriatic acid is precipitated by tannin, corrosive sublimate, iodohydrargyrate of potassium, terchloride of gold, and bichloride of platinum.

The purple solution of rhœadina in acids is rendered colorless by repeated treatment with animal charcoal, and contains now another alkaloid, *rhœagenina*, which is precipitated by ammonia, and purified from hot alcohol. It occurs in small white prisms, sparingly soluble in ether, alcohol, water and ammonia, readily soluble in acids without coloration, except nitric acid, which decomposes it, producing a yellow color. It is tasteless, but the salts are bitter. It is fusible, but not sublimable, and is a strong base of the composition $C_{42}H_{21}NO_{12}$.

The author describes the sulphate and several other salts, all of which are uncrystallizable. He then suggests the relation of rhœadina with sanguinarina, from which it differs by lactic acid $C_{42}H_{21}NO_{12}+2HO=C_{36}H_{17}NO_8+C_6H_6O_6$; the formation of a red coloring alkaloid, and, as obtained by J. and H. Smith, the production of lactic acid from opium, under certain circumstances, seem to favor this relation. It also differs from Merck's papaverina only by the elements of carbonic acid ($C_{42}H_{21}NO_{12}=$

$C_{40}H_{21}NO_8+C_2O_4$); a little carbonic acid is evolved when rhœadina is boiled continually with sulphuric acid.—*Annalen der Chem. und Pharm.* cxl. 145—153.

J. M. M.

ON THE POISONOUS PROPERTIES OF THE BOUNDOU, PROOF POISON OF THE GABONESE.

By M. M. Pecholier and Saint Pierre.

The Boundou (Icaja or M'Boundou) is a tree of the family Apocyneæ which partakes, with other plants of this family (Oleander) the property of being a violent poison. It is used in Gabon (Africa) to prepare the proof liquor in judicial duels. (See Thesis of M. Touchard; Montpellier, 1864.)

We have been very fortunate in procuring some roots of this tree, thanks to the kindness of Dr. Falot, a distinguished physician of the Imperial navy. The small quantity of the product has not permitted us to undertake a research for its active principle, but we have assayed with the aqueous and alcoholic extracts to determine the poisonous action of this vegetable. Several animals (rabbits, dogs, frogs, etc.) have been poisoned in the experiments, the results of which we have the honor to present to the Academy.

1st. Boundou contains an active principle, soluble in both water and alcohol.

2d. This poison has a mode of action analagous to that of nux vomica; that is to say, its effects are principally on the system of sensitive nerves.

3d. Administered either by the stomach or by the endermic method, it produces at first an augmentation of the number of inspirations and pulsations of the heart, followed by a considerable diminution of these movements.

4th. This poison causes at the same time an increase of sensibility, followed by tetanic convulsions; finally, insensibility, paralysis and death.

5th. Its action on the nerves of motion is but secondary; it does not effect the contractility of the muscles. It is not a heart poison; this organ, on the contrary, continues to beat some time after death.

6th. In many experiments where we have observed very grave symptoms and apparent death, we have seen the animals slowly return to life. If, as is reasonable to think, the action on man is identical, we can understand why the Boundou has been chosen by the Gabonese for a proof poison. In the judgment of God, the champions recover slowly from the worst symptoms, but are restored gradually to health, seemingly recalled to life by the divinity, jealous of demonstrating their innocence.—*Comptes Rendus in Jour. de Pharm. Janv.* 1867.

ON A METHOD OF DISTINGUISHING ARSENIURETTED HYDROGEN FROM ANTIMONIURETTED HYDROGEN.

By M. Dragendorff.

This process is founded on the action exercised by solid caustic potassa, in fragments, on antimoniuretted hydrogen, precipitating the metal from it, whilst no such effect is produced on arseniuretted hydrogen. If, therefore, a mixture of the two gases is passed through a tube filled with fragments of the alkali a complete separation is effected, and the arsenical gas may be burned separately. The fragments are coated with a brilliant layer of antimony. A ley of potassa sp. gr. 1.25. has but little effect. When the mixture of antimony and potassa is exposed to the air the former is oxidized, and assumes the form of antimoniate of potassa when the mixture is placed in contact with water.—*Jour. de Pharm. Janv.* 1867.

OXALATE OF IRON A NEW TONIC.

The following communication from Mr. J. Emerson Reynolds has been addressed to 'The Medical Press and Circular' of Nov. 28.—"Allow me to draw your attention to a preparation of iron, which has been much neglected, if not altogether overlooked. I refer to the oxalate of the protoxide of iron. Having lately used it in cases requiring the exhibition of a compound of the metal, I observed that it was borne with remarkable ease by the stomach, possessed little if any astringency, and produced the usual constitutional effect with sufficient rapidity. The salt is

easily prepared by adding a solution of protosulphate of iron to an excess of oxalate of ammonia solution containing a little free oxalic acid, a yellow precipitate is thrown down, which is the compound in question; this should be well washed and then dried. By having an excess of oxalic acid present any per-salt formed is held in solution. The precipitate yielded on analysis results agreeing with the formula $Fe\ O, C_2 O_3 + 4HO$, and therefore contains one-third of its weight of oxide of iron, one-third of oxalic anhydride, and the rest of water. The salt, when prepared as above directed, is a fine powder of a straw-yellow color, almost devoid of taste and singularly slow to oxidize in contact with the air. It is slightly soluble in water, but more easily acted upon by a dilute acid, and is decomposed by the alkalies of their carbonates. When burned in the open air it leaves a residue of pure peroxide of iron in a condition particularly favorable for the production of *fer réduit*. In conclusion, I may remark that the oxalate of iron requires but *three* atoms of oxygen for its complete oxidation in the system, whereas for a given weight of iron the tartrate of the peroxide needs *ten* equivalents, and the citrate *eighteen* of oxygen, to effect the same end."*—*Pharm. Journal, Jan.* 1867.

ON THE EFFECT OF TEMPERATURE ON ORGANIC MATTER IN WATER.

Dr. Frankland writes:—"With regard to the temperature at which the putrefaction and decay of organic matter in water take place, I find that the following is all that appears in the printed report of my evidence on the subject in the case 'Duke of Buccleuch and others *v.* Alexander Cowan and others,' recently tried at Edinburgh. 'Where a river becomes sluggish—as where it is pent up by a weir—the quantity of organic matter, and also of mineral matter, increases in some cases very considerably; but that is only the case in warm weather, and the temperature of the water must be 55° Fahrenheit and upwards, for this effect to be produced. The putrefaction of the

*[This salt has been recommended as a chalybeate by Prof. Craig, of the Smithsonian Institution as far back as 1858.—Ed. Am. Jour. Pharm.]

mud in the bed of the river ensues, and the previously insoluble matter becomes soluble matter.' The safest and most sensitive test of putrefaction in water is the relative proportion of oxygen to nitrogen in the dissolved gases. The river North Esk, as it flowed through the Duke of Buccleugh's grounds, at Dalkeith Palace, in March and in June last, afforded striking evidence of this kind as to the effect of temperature upon the absorption of oxygen by the organic matter of water. (It is only when the whole of the oxygen dissolved in the water is consumed, that the latter assumes a true and offensive putrefactive condition.) On the 3d of March, the temperature of the water in the North Esk was 38° Fahrenheit, and the proportion of oxygen to nitrogen in the dissolved gases was O : N = 1 : 2·02. This is the normal proportion in water free from organic matter. On the 21st of June, the river emitted a putrid odor, the temperature of the water was 60° Fahrenheit, and the proportion of oxygen to nitrogen was O : N = 1 : 25; thus the amount of dissolved oxygen was reduced to a mere trace, and the organic matter was in a putrescent condition."—*Lond. Chem. News*, December 7, 1866.

HIVE SYRUP.

By L. W. Gillespie.

In looking round for a process to test the capabilities of dialysis in its application to pharmacy, it occurred to me that the compound syrup of squills would afford a very good example, and one of great value to the pharmaceutist, if successful, in rendering this preparation permanent, and in doing away with the use of alcohol in its manufacture. With these ideas in view I made three separate solutions, one with dilute alcohol, as directed in the *Pharmacopœia*, another by using only half the amount of alcohol, and a third by boiling in water as formerly practised. This last failed to produce anything like a satisfactory result, and I had to abandon all idea of being able to dispense with the use of alcohol in its manufacture. With the second process I was more successful; yet still a large amount of pectin and gum refused

to pass through the dialyser. The first process in which dilute alcohol had been used succeeded perfectly, and I have no doubt will keep as long as any other syrup of the Pharmacopœia; though sufficient time has not yet elapsed to test its keeping qualities. All that is necessary is to make a tincture of the squills and senega as directed in the Pharmacopœia. Place this solution in a porous vessel surrounded with water and put aside to dialyse. After the lapse of forty-eight hours the water contained in the outer vessel will be found to have become quite thick and syrupy, owing to the presence of a large amount of gummy substances which, first pass through the porous diaphragm and dissolving in the surrounding water, leave behind the crystalline compounds, hardly a trace of which can be found in the water, showing that in this case the accuracy of the process is due to the great difference in the specific gravity of the two liquids, which is also the reason of the failure of the aqueous decoction. The process is completed by evaporating the solution contained in the inner vessel and making it into a syrup as directed in the Pharmacopœia.

In the course of my experiments a few practical ideas suggested themselves which are absolutely necessary to be considered in conducting this processs. The greater the difference in the specific gravity of the two liquids the more accurate will be the results obtained. So also as regards the solubility of the different salts held in solution. Light and warmth hasten the process of dialysis very materially, and care should be taken to keep the two liquids at the same height until the process is completed. The diaphragm ought to be made of the best white porous ware, and before using should be soaked in dilute nitric acid, and afterwards well washed in water to remove all soluble salts. When such a vessel cannot be obtained, a common flower-pot will answer instead. In conclusion, it is my belief, that owing to the inaccuracy of the process of dialysis it can never be very extensively used in Pharmacy.

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The Drug. Cir. and Chem. Gazette.

IMPROVED PROCESS FOR OFFICINAL FLUID EXTRACT OF BUCHU.

By Edward R. Squibb, M. D., of Brooklyn.

To the American Pharmaceutical Association:

As a member of your Committee upon the United States Pharmacopœia, the writer begs to offer the following criticism upon the officinal process for Fluid Extract of Buchu, and to suggest some slight modifications which may be improvements if applied with the necessary care and skill. The officinal process is as follows:

"Take of Buchu, in moderately fine powder, sixteen troy-ounces;

Alcohol a sufficient quantity.

Moisten the Buchu with six fluidounces of alcohol, introduce it into a cylindrical percolator, press it firmly, and gradually pour alcohol upon it until twelve fluidounces of tincture have passed. Set this aside, and continue the percolation until two pints more of tincture have been obtained; evaporate this by means of a water bath, at a temperature not exceeding 150°, to four fluidounces, and mix it with the reserved tincture. Allow the mixture to stand for twenty-four hours, and filter through paper."

The writer, as a member of the Committee of Revision which adopted this formula, in criticising its language, is but reproducing here arguments used in the Committee, and overruled there by much better scholars than himself, and upon competent authority; and to bring these views forward now in public may well be taken as evidence of captiousness, and unwillingness to submit to authority; or of a self-sufficient stubbornness which often accompanies ignorance. Still it will do no harm to others, in view of future revisions, to have the language as well as the process re-examined and re-confirmed if it be right. This is the first formula under the head of the Fluid Extracts, and its language in the points to be criticised is a type of the entire Pharmacopœia, and its process is typical of the whole class of Fluid Extracts.

Language is made to express ideas, and grammar is made for language; and, therefere, when language expresses ideas best and most definitely, grammar should establish its construction.

The writer believes the sentence "until twelve fluidounces of tincture have passed," and all others like it, to be faulty in construction. Although "twelve fluidounces" taken alone as an abstract number of ounces is undoubtedly plural, yet "twelve fluidounces of tincture" as a prescribed quantity or measure is no more plural than "a pint" would be. Besides, the "twelve fluidounces" is not the real subject of the verb, but rather an adjective used to qualify or define the quantity of the tincture, which tincture in such quantity is the real subject or nominative of the verb. This being singular would require the verb in the singular also. Suppose the sentence was constructed to read "until three-fourths of a pint of tincture," or "until the measure of twelve fluidounces of tincture," there would then be still greater difficulty in the way of using the plural of the verb. Besides this, the present construction contradicts, or rather corrects itself, in the first two words of the next sentence.

For consistency or unity of idea, as well as for the uniformity of gramatical construction, these words should be "Set these," the twelve fluidounces of tincture being understood, and not as at present, "Set this." The same sentence thus commencing with one measure in the singular ends with another prescribed measure, namely, "two pints more of tincture," in the plural. The next sentence takes up this plural again as a singular by saying, "evaporate this"—two pints more of tincture being understood, and being plural here if anywhere—"to four fluidouuces" and mix "it" with the reserved tincture. The words "four fluidounces" are here used as a measure, but here do *not* render the tincture plural. For these reasons the writer argues that the phraseology should be made to carry the idea clearly, rather than to carry out a system of grammar whose rigidity in parsing governs the *subject* of a verb by a preposition, and thus converting it, through a subject, into the *objective* case, while the so parsed preposition is in reality only a conjunction used to unite a qualifying or defining adjective expression to the noun to which it belongs.

The word "tincture" seems to be badly chosen for use in this connection, since it tends to confuse this class with the class of

"tinctures," while the word percolate would appear to be more accurate as well as more appropriate.

The next criticism is upon the more important points of the practical application of the process; and here the writer feels much more within his own legitimate sphere. "Buchu in moderately fine powder" is directed. This degree of fineness is defined, on page 7, as being obtained by a sieve of fifty meshes to the inch. The writer's experience indicates that a much finer powder is better; that the ordinary dusted powder, which passes easily through a sieve of one hundred and twenty meshes to the inch, works well in practice on any scale; and that it is impossible to have the powder too fine. The most important of the cardinal rules which apply to successful percolation, and that upon which the success almost entirely depends, is the rate at which the percolate passes, and this cannot be well controlled in the use of coarse powders.

In the use of the Pharmacopœia quantities, or indeed upon any moderate scale, the percolate should pass off not faster than a drop in each second at first, getting a little faster as the exhaustion progresses. The most successful and thorough percolations are the slowest, and such require the smallest quantity of menstruum for exhausting. The best efforts of the writer, when operating on quantities of from thirty to fifty times the officinal formulas, have been with dusted powders, percolated at the rate of a drop for every three seconds, or twenty drops a minute, this rate being obtained of course through the fineness of the powder as well as by the packing.

The next point to be noticed is that the quantity (two pints) of weak percolate directed to be obtained is excessive in view of the present cost of alcohol, and the amount of medicinal extract obtained by it. The s. g. of the alcohol used as the menstruum is ·835. That of the reserved percolate is ·914. That of the first of the two pints of weak percolate is ·861. And that of the second of the two pints is ·844. This two pints of weak percolate, when evaporated slowly to four fluidounces, has a specific gravity of 1·049, much of which gravity is due to oxidation during the evaporation. When the two portions are mixed together, and before the filtration, the s. g. is ·953. After filtration it is ·946.

It follows, from these observations, that specific gravity is a good and sufficient indication of the strength of the percolate, and therefore of exhaustion of the drug. And it also follows, from a crude but practical calculation or estimate, based on the specific gravities and the inert residues, that the first pint of weak percolate cannot contain more of the medicinal properties of the drug than would be contained in two and a half ounces of the powdered buchu; and that the second pint could not contain more than one seventh of this. The medicinal properties of the drug would thus be distributed in the percolate as follows:

First 12 f℥, or reserved percolate, represents	13·14	℥
First pint of weak percolate "	2·50	"
Second " " "	0·36	"
	16.00	"

From this it appears that the process might be terminated at the end of the first pint of weak percolate with the loss of thirty-six hundreths of the medicinal strength of one troyounce of buchu, but with the saving of one pint of alcohol; always provided the percolation be skilfuly conducted.

The next point to be noticed is that the evaporation of the two pints of weak percolate to four fluidounces, much of the medicinal portion is sacrificed,—first by being driven off, and second by oxidation and other changes. A very considerable portion of the deposit which occurs during this evaporation is insoluble in the original menstruum.

Finally, the filtration through paper is tedious and wasteful. Even when accomplished through a covered funnel into a bottle, the loss by evaporation in moderately warm weather was two fluidounces; and the portion which refused to pass through measured nearly one fluidounce more.

The cost of a pint of this fluid extract by the officinal process is nearly as follows,—the pint weighing a little over fourteen ounces avoirdupois:

16 troy ounces=1 lb. 1¾ oz. avoirdupois.

of Buchu, powdered, . .	$ .90
3¼ pints Alcohol, . .	1.79
	$2.69

And this without estimating apparatus, labor, time, skill, interest, risk, insurance, or anything but real cost of material used: and of this material the alcohol costs twice as much as the drug.

As one way of remedying the disadvantages complained of, the writer would suggest to the next Committee of Revision the following process:

Take of Buchu, in very fine powder, 48 troyounces.
Alcohol, a sufficient quantity.

Divide the buchu into three equal portions. Moisten one portion with six fluidounces of alcohol, pack it moderately in a cylindrical percolator, and pour three pints of alcohol upon it. When the last of the alcohol disappears below the surface of the powder, remove the disc of muslin or paper from the surface, and fill up the percolator with water. Then, as the percolation slackens, scrape off the upper softened layer of the exhausted powder, and mix it thoroughly with the water by means of a square-ended wooden spatula. This scraping off of the softened portion without disturbing the hard part below is to be repeated at intervals, according to the rate of percolation, until the water becomes thick with the swollen and exhausted powder. It is then poured off and replaced with fresh water, and the scraping continued as before; and this management is repeated, more cautiously toward the close, until the alcohol is all pushed through, and water appears at the outlet of the percolator.

Receive the percolate in four separate portions of twelve, six, eight, and twenty-two to twenty-four fluidounces, and set aside the first portion of twelve fluidounces as reserved percolate.

Moisten a second portion of the buchu with the second portion of the percolate from the first percolation (the six fluidounces), pack it in a second cylindrical percolator (or the first one readjusted), and pour upon it the third portion of the percolate from the first percolation. When this has all been absorbed by the powder, add the remainder of the percolate from the first; and when this has disappeared, add first two fluidounces and then four fluidounces of alcohol; and then water, managing the process precisely as in the first percolation.

Receive the percolate in four separate portions of sixteen, six, eight, and ten fluidounces, and set aside the first portion of sixteen fluidounces as reserved percolate.

Moisten the remainder of the buchu with the second portion of the percolate from the second percolation, and having packed it in the cylindrical percolator, pour on the third and fourth portions of the percolate from the second percolation in succession, and after these, eight fluidounces of alcohol in two portions. Finally add water, and proceed as in the first percolation.

Receive the percolate in two separate portions of twenty and ten fluidounces (or the remainder), and set the last of these away, to be used as so much alcohol at the next making of this fluid extract.

Finally, mix all the three portions of reserved percolate together, and make the whole measure three pints by the addition of whatever may be wanting of that measure from the final percolate set away for the next making.

In repeating this process twice with care, it was found to work well in practice, and to yield a preparation which is at least equal to the officinal in therapeutic value.

The total quantities of material used are as follows:

Powdered Buchu, 3 lbs. 5¼ oz. @ 80 cts.,	$2.67
Alcohol, 4¼ pints, @ 55 cts.,	2.34
For three pints, weighing 2 lbs. 11 oz.,	$5.01
" one " " 14 oz.,	1.67

This requires but one more pint of alcohol for the three portions than the officinal process requires for one portion, and diminishes the cost exceedingly; but it requires more education and skill, and involves more risk of an imperfect preparation through want of skill. The result of the first percolation is least important, since the quantity of menstruum there used is as great as in the officinal process, and the exhaustion thereby secured; but as the errors of packing and management are easily seen in this first percolation, they can be as easily corrected in the succeeding trials, and thus tend to safety and uniformity of result.

The powder, when properly moistened and packed, holds with great uniformity about fifteen fluidounces of menstruum, and by the dexterous use of water, as directed, eleven fluidounces of this may be each time recovered by pushing it through. Thus the total loss of alcohol in this way does not exceed twelve to fifteen

fluidounces, the remainder of the twenty fluidounces being lost by evaporation.

The s. g. of the first reserved percolate, namely, the twelve fluidounces, is ·910 to ·912. That of the second reserved percolate, namely, the sixteen fluidounces, is ·915. That of the third, namely, the twenty fluidounces, is ·912. That of the whole when mixed together is ·914. The s. g. of the first twelve fluidounces of the three percolations is ·910, ·924, and ·926. In the officinal process it is .914. Each four fluidounces, after the twelve, of the middle percolation, is ·887, ·873, ·867, ·862, ·855 and ·848. And each four fluidounces requires about two hours to pass when the percolation is most successful. The two final portions of four fluidounces each, set away for the next making, have specific gravities ·867 and ·857.

Although one percolator is sufficient to carry out the process, the time may be considerably shortened by the use of two, since the second one may then be packed as soon as the second portion of the percolate from the first is received. Flasks marked to the measured quantity in the neck should always be used to receive the percolate, otherwise the evaporation from each drop as it accumulates in a slow percolation entails great loss.

The first twelve fluidounces of percolate, both in the officinal and the proposed process, must represent more than twelve troyounces of the drug, and yet its s. g. is far below that of the finished officinal preparation, and a little below that of the proposed preparation; thus showing that s. g., though a good indication of exhaustion, is not so good an indication of medicinal value.

The avoiding of heating, evaporating, and filtering in the proposed process, are considered to be of primary importance.—*Proceed. Amer. Pharm. Assoc.*, 1866.

NOTE ON PURIFIED ESSENTIAL OIL OF ALMONDS.

By William A. Tilden, F. C. S.

Demonstrator in the Laboratory of the Pharmaceutical Society of Great Britain.

A few days ago I came upon two specimens of essential oil of almonds which I had prepared in 1864 in illustration of a short

communication I had the honor of reading at one of the evening meetings of this Society. I suggested, at that time, that it was probable this essential oil might be rendered more permanent than in the purified state it is generally found to be by introducing into it some fused chloride of calcium, so as to remove from it the last traces of moisture.

These specimens I produce in support of that suggestion; they have been prepared upwards of two years, and have been preserved side by side under precisely the same conditions. The one, as you see, is filled with crystals of benzoic acid; the other in which is placed a fragment of chloride of calcium, is perfectly free from crystalline deposit, and remains quite fluid. These bottles seem to me to exhibit clearly the very decided influence of perfect drying.* Shortly after the publication of my paper, a wholesale drug firm in this city wrote to the "Pharmaceutical Journal," announcing that the purified essence prepared by their process was perfectly free from the objection attaching to purified oil of almonds in general, being permanent and inalterable for any indefinite period. As this was quite in opposition to the remarks made by myself and others at the meeting referred to, I was anxious to test their statement, it being an interesting point to determine, whether it were indeed possible to render the almond essence less susceptible of oxidation. I accordingly procured a quantity of this essential oil.

It was examined, first of all, for the evidence of change, for benzoic acid. It was found to be strongly acid to test-paper, although no crystallization was apparent except at the stopper. This circumstance, coupled with the limpidity of the liquid, and its sp. gr., which was as low as 1·003 or thereabouts, led me to suspect the admixture of spirit of wine. On application of Dr. Redwood's test, fuming nitric acid, it gave, as anticipated, abundant evidence of alcohol by the violent evolution of nitrous fumes. Here also proof was obtained that the change effected in the liquid by the air was in an advanced stage, for, on cooling, the

*I am informed by Mr. C. Umney, who is in the habit of purifying essential oil of almonds on a large scale, that he has found the above plan of desiccation by means of chloride of calcum to succeed perfectly in preventing change in the purified oil.

mixture became nearly solid from the deposition of nitrobenzoic acid. Two other (pure) specimens tried at the same time, remained fluid many days.

Not content with the nitric acid test alone, I separated a quantity of the alcohol bodily by the following plan, which may equally well be applied to any other essential oil:—Six measures of the oil were agitated with six measures of water in a graduated tube; on standing, 4¾ measures of oil only subsided; the aqueous liquid was separated by a pipette and saturated with carbonate of potash; on remaining at rest a few minutes, about one measure of alcohol separated as an oily stratum floating on the surface. It was recognized by the ordinary tests. I have examined other samples of commercial purified oil of almonds. They are certainly all equally liable to change, the permanence of those which are alleged to be inalterable being only in appearance, the benzoic acid, as formed, remaining in solution. The addition of alcohol would, moreover, tend, in my opinion, to facilitate rather than obstruct the absorption of oxygen.—*London Phar. Jour.*, *Dec.*, 1866.

REMARKS ON SOME CHEMICAL PROCESSES

By C. Lewis Diehl, Jr.

The object of this paper is to point out some difficulties that are met with by the manufacturing chemist and by the pharmaceutist in the pursuit of his calling. Our standard works on chemistry and pharmacy will give formulas which, if strictly followed and properly understood, will generally yield the desired product. Yet sometimes the operation will fail, notwithstanding the greatest care on the part of the operator, and will cause him to regard a process as faulty, which would really yield a handsome product if carried out with the proper attention to the minor details. Manufacturing chemists, as a general rule, will not publish their experience in the manufacture of their preparations, as they wish to make as much capital out of any improved process they may have, as possible. It is to be regretted that they do not show more disinterestedness in this respect, as by the publication of their experience they would greatly advance

the cause of science. The efforts of Dr. E. R. Squibb in that line are truly commendable, and to him are due many improved chemical processes now extensively applied. His example should be imitated by all true friends of science; the plea that it is against their interest to publish the result of their experience, may be met with the simple argument "that he who is capable of inventing or improving a process, will always have the start of the one who has to wait for the invention."

In explanation of the remarks I am about to make, I wish to state that I offer them simply as the result of my own experience. I do not claim any originality to any of them. I merely wish to point out the difficulties I have had, and how I have overcome them.

Acid. Phosphor. Dilut. The U. S. Pharm. directs this to be made in a porcelain dish, covered with a glass funnel. The difficulty that occurred to me was caused by the frequent breakage of the funnel and consequent loss of phosphorus, not to speak of the annoyance to the operator. This breakage is almost always caused by the addition of the water or nitric acid to the materials during reaction, and notwithstanding I always observed the greatest care in the addition, breakage could not be avoided. I therefore concluded to try the old method, by oxidizing the phosphorus in a glass retort, with results entirely satisfactory. The following is the process pursued by me, which I can recommend as perfectly safe:

Introduce into a French glass tubulated retort of capacity of 42 parts, 12 parts of water and two parts of phosphorus. Place the retort on a sand bath and introduce through a funnel tube, fixed in the tubulure by means of a cork and reaching half an inch below the level of the liquid, eight parts of nitric acid. Apply gentle heat and watch the operation closely as soon as reaction commences. When the reaction slackens add more nitric acid in portions of about one-fourth part at a time. Should the reaction become violent, small quantities of warm water must be added until it is reduced to its ordinary action, which may be compared to the gentle boiling of water. The formation of frothy bubbles on the surface of the liquid is always the forerunner of violent reaction and should be checked at once. I

have found that if it was checked at this stage, a comparatively small amount of water would answer, but if allowed to react violently a much larger quantity of water was necessary. The evaporation of the acid, after the phosphorus is all oxidized, is conducted in a porcelain capsule; towards the end of this process it will froth up, owing to the rapid disengagement of nitric oxide. The dish must therefore have about three times the capacity of the acid when concentrated, and a little distilled water should be kept conveniently near, to add in case there is danger of frothing over. It is scarcely necessary to add that the operation should be conducted under a good furnace hood, or otherwise the beak of the retort should be introduced into a good flue.

Sulphate of Manganese. Wishing to make some of this salt, I adopted the following formula, which gives an abundant yield of the pure salt:

Introduce into an iron crucible a mixture of five parts of peroxide of manganese and three-fourth parts of coarsely powdered charcoal. Cover the crucible and heat to redness until all the charcoal is consumed. Allow the contents of the crucible to cool, place in a porcelain dish and add 6½ parts of sulphuric acid. Evaporate nearly to dryness, return the mass to the crucible and heat to redness. When cool rub to powder, if necessary, and treat twice successively with eight parts of boiling water; mix the liquors, filter and evaporate until a pellicle begins to form, when set aside to crystallize.

If evaporated too far an insoluble sulphate is deposited, (probably in a peculiar state of hydration), hence care must be taken to remove it from the sand-bath as soon as a pellicle begins to form. When a good article of peroxide of manganese is used, this formula will give an abundant yield of perfectly pure sulphate of manganese. Any iron or copper present is destroyed by heating the crude salt to redness.

Ammonio-ferric Alum. In making this salt according to the U. S. Pharm. formula I found that, instead of obtaining crystals of a clear violet tinge, they had a brownish color. I first ascribed it to unskilful manipulation, but on repeated trials met with similar results, sometimes, however, approaching in appearance to

the commercial article. As the addition of a small quantity of sulphuric acid to a solution of salt prevents its decomposition, caused by the formation of a basic ferruginous salt, I concluded to try the effect of a little sulphuric acid, and met with perfect success. By the addition of 1 fl. oz. sulphuric acid to 1 gall. liquor ferri tersulphat., I obtained crystals of a beautiful violet tinge and perfect form. These were simply drained thoroughly and immediately bottled. I have been so far unable to obtain the salt perfectly dry without injuring its appearance. The mother liquors will yield another cup of crystals if evaporated gently and filtered. If the solution is not filtered the salt will have a rusty appearance from the decomposition of a portion of the salt. When large quantities are made it is better to use the mother liquors with a new portion of materials.

Tinct. Chlor. Iron. When the Pharmacopœia direction is strictly followed in making the solution of sesqui-chloride of iron for this tincture, there is danger of the liquid frothing over towards the completion of the process, unless the capacity of the dish is very much larger than the bulk of its contents. By long-continued heat a portion of the muriatic acid, present in the preparation before the oxidation is completed, is also wasted and frequently sufficient to cause a basic chloride to be formed, which, when mixed with the alcohol, is deposited, sometimes immediately, sometimes after the lapse of a few weeks. This has happened to me on several occasions, and others have had similar experience. For several years I have pursued the following manipulation in its manufacture, and have met with invariably satisfactory results. The materials and relative proportions used are the same as in the officinal process:

Make the solution of proto-chloride of iron according to the officinal directions and filter. Heat it to the boiling point, add the reserved portion of muriatic acid, and take immediately from the sand-bath. Into another vessel (capable of holding one-half more than the solution will measure when completed), pour three-fourths of the nitric acid required. Place the vessel in the sand-bath from which the solution of chloride of iron has been removed, and add the latter in small portions as long as effervescence is produced. If effervescence should cease before all

the iron salt is oxidized, nitric acid must be added in small portions until the completion of the process. Proceeding in this manner the same result is obtained as required by the Pharmacopœia, the danger of frothing is avoided and a permanent tincture is obtained.

Dilute Hydrocyanic Acid. It is well known that when this acid is not carefully secluded from light it is rapidly decomposed and deposits a black substance (Paracyanogen). Wittstein, in his formula for this acid, recommends the use of alcohol as a preservative, and I wish to state that I have prepared an acid according to this formula which has kept without any apparent change for four months, although freely exposed to the light during that entire period. His formula is as follows:

Dissolve 4 oz. ferrocyanide of potassium in 16 oz. of distilled water, to which add a cold mixture of 3 oz. sulphuric acid and 12 oz. alcohol, sp. gr. ·840. Allow the mixture to stand for twenty-four hours, shaking it occasionally. Separate the crystalline deposit by means of a strainer and introduce the clear liquid into a retort, the bottom of which is covered to the depth of one inch with clean quartz sand. Distil off 20 fl. oz. and reduce the distillate to the proper strength by the appropriate tests. The object of using sand in the retort is to prevent the thumping, which is always a source of great trouble during the latter part of the distillation.—*Proceed. Amer. Pharm. Assoc.*, 1866.

NOTES ON LIQUOR BISMUTHI.

By George F. H. Markoe.

Much has been written on the preparation of Liquor Bismuthi both in this country and in England, where it was introduced by Mr. Schacht. Mr. R. C. Tichborne was the first to make known the composition of the solution, in an able paper to the London Pharmaceutical Society, in which he proved the bismuth to be present in the form of an ammonio-citrate.

Mr. N. Gray Bartlett, in a paper published in the Jan., 1865, number of the Am. Journal of Pharmacy, gave an excellent working process for the making of citrate of bismuth and ammonia in scales, and also in solution.

The writer has used Mr. Bartlett's process many times, and always with good results, but considers the modifications suggested by Mr. A. E. Ebert, published in the Am. Jour. Pharm., Jan., 1866, of much practical advantage, as it shortens the process, especially the washing of the citrate of bismuth on the filter, which is at best a tedious operation.

The writer has but one new point to suggest, and that is with regard to an improved method of assaying the bismuth solution. Sulphide of ammonium and sulphydric acid are the reagents usually employed in the assay of bismuth solutions and give very good results, but they both possess a most disgusting odor. The writer has found that sulphide of sodium, while it gives excellent results, equal in accuracy to those obtained by the use of the first named reagents, has the advantage of giving a denser and hence a more easily washed precipitate of ter-sulphide of bismuth. It has but little odor and can be used in the shop or laboratory without filling the atmosphere of the room with the smell of sulphuretted hydrogen. The point of saturation is readily determined, and the sulphide of bismuth formed is absolutely insoluble in an excess of the precipitant.

Sulphide of sodium may be prepared by the following formula:

Take of solution of soda three parts, and conduct sulphydric acid gas into the solution as long as it is absorbed, and when the saturation is complete add two more parts of solution of soda and keep the sulphide of sodium in well stopped bottles.

With a view to test the value of sulphide of sodium as a reagent a number of assays of commercial samples of liquor bismuthi were made. Both of the samples were of New York make, and are furnished to the trade in pound bottles.

No. 1. A colorless liquid with a sweet taste and the flavor of caraway, leaving an after-taste of metallic character. The specific gravity at 60° was 1·45. Four assays of this solution were made by precipitating the bismuth as ter-sulphide by means of an excess of sulphide of sodium, and the average results of these assays were eight and one-half grains of ter-sulphide of bismuth from each fluid-ounce, equal to seven and seven-tenths grains of ter-oxide of bismuth, or fifteen and four-tenths grains of ammonio-citrate of bismuth. This solution, then, is just what it purports

to be, as stated on the label, which claims that the solution contains sixteen grains; the deficiency of six-tenths of a grain in a fluid-ounce being so small that it may be referred to the loss consequent on the manipulation in making the assay.

No. 2. A colorless liquid, having an alcoholic odor and a specific gravity of ·995; it was free from flavor and sugar, having only an alcoholic flavor, and the peculiar metallic after-taste of ammonio-citrate of bismuth. The average result of four assays was five and six-tenths grains of ter-sulphide of bismuth, equal to five and eight-hundreths grains of ter-oxide of bismuth, or ten and sixteen-hundreths grains of ammonio-citrate of bismuth. The label on the bottle of this liquor bismuthi states that each teaspoonful of the solution contained two grains of the ammonio-citrate of bismuth, which would be sixteen grains of the bismuth salt in each fluid-ounce. The quantity found was only 10·16 grains, showing a deficiency of about six grains in each fluid-ounce.

The writer has found the loss of citrate of bismuth in his practice to be about seven per cent., a quantity too small to pay for the time and trouble of regaining by the use of sulphuretted hydrogen, but by the use of sulphide of sodium it may be readily recovered; yet, unless the quantity is large, it will not pay. In working with twenty ounces of subcarbonate of bismuth it will require about six gallons of water to free the citrate of bismuth from the nitrate of potassa formed in the process, and in these washings the small portion of citrate of bismuth is found in a very dilute solution.—*Proceed. Amer. Pharm Assoc.*, 1866.

LIEBIG'S EXTRACT OF MEAT.

The following communication from Baron Liebig appears in the *Pharmaceutical Journal* for November:—

In the last number of your journal (October, p. 196), I find an excellent contribution from Messrs. Deane and Brady on "The Results of the Micro-Chemical Examination of Extract of Flesh."

I beg you will allow me to make a few remarks which may form a proper basis of judgment of extract of meat, and partic-

ularly South American, respecting its color, taste, and consistency.

You are probably aware of my having accepted the office of Director of the Scientific Department of Leibig's Extract of Meat Company (Limited), and on conditions calculated to offer to the public a complete guarantee of the genuineness and purity of the extract manufactured by that company.

One of my former assistants, Mr. Seekamp, is the manager of the chemical branch of the manufactory at Fray Bentos; another of my assistants, Dr. Ch. Finck, is acting at the general depot of the company. One manufactures the extract according to my special directions; the other receives it at Antwerp, and is bound to take a sample of each package, and to forward it to my laboratory at Munich for analysis. The packages are tin canisters of 36 to 45 lbs. each; the extract is sold only after being approved by myself. You will perceive thereby, that I control not only the manufacture according to my process of the extract at Fray Bentos, but also its quality when sold by "Liebig's Extract of Meat Company (Limited)," and I may safely assert, therefore, that the Fray Bentos extract does not contain any gelatine, or any thing that can be considered as such.

Gelatine does not belong to the composition of extract of meat, and must, therefore, be excluded as much as possible; it gives more consistency to the extract, and allows, to the detriment of buyers, of a larger percentage of water, and makes it liable to turn mouldy. But the action of tannic acid, as a reagent, might lead to erroneous conclusions, against which it is necessary to guard.

In my little work "On the Chemistry of Food" (Taylor and Walton, London, 1847), I say, p. 141: "The portion of the juice of the flesh which is soluble in cold water, but not in alcohol, is precipitated by tannic acid; the precipitate softens like plaster in hot water, and cannot be distinguished from the tannate of gelatine, but it differs from the gelatine by that characteristic property of both, that it does not gelatinize when concentrated." Extract of meat, then, may and does precipitate with tannic acid, even when entirely free from gelatine.

By the exclusion of gelatine, the yield in extract is naturally

diminished. According to a recent communication received from Mr. Seekamp, 34 lbs. of fresh lean meat yielded only 1 lb of extract as manufactured at Fray Bentos (corresponding with 45 to 48 lbs of butchers' meat, inclusive of fat and bones).

It has been observed that the color and taste of the Fray Bentos extract vary; this is owing to the difference of sex and age of the animals.

The meat of oxen always yields an extract of darker color and stronger flavor, reminding somewhat of the flavor of fresh venison, pleasant when diluted; the extract of cows' meat is of lighter color, and a mild flavor, and is preferred by many persons. The meat of animals under four years old cannot be used for the manufacture of the extract; it yields a pappy extract of weak taste, like veal, and without flavor.

According to the predominance of ox or cows' meat, the color and taste of extract varies, which is by no means a fault of the manufacturing process, as is fully explained by the preceding remarks. The extract of ox meat is, however, richer in creatinine and sarkin than cows' meat extract.

The extract received from Munich, and examined by Messrs. Deane and Brady, was cows' meat extract—the Bavarian Pharmacopœia prescribing the use of cows' meat, and not of ox meat.

These gentlemen observed that they never experimented on a sample which they had any reason to believe to be adulterated with chloride of sodium (common salt). My experience has taught me that such falsification, more especially by retail dealers, is by no means a rare occurrence, and it is even practised by manufacturers.

I hold a sample of extract, manufactured by Dr. Tenner, of Darmstadt, containing 9 per cent. of common salt, and, besides, 26 per cent. of water more than the Fray Bentos extract. He sells it in jars, with the labels stating that the extract is prepared "according to Liebig's process."

It is extremely difficult, as regards extracts of meat, the genuineness and purity of which are not discoverable by the eye, to protect the public against fraud; all manufacturers prepare their extract according to what they call "Liebig's process;"

but since I have given only general, and not special, directions for manufacture, it so happens that every one fills in the details after his own fashion, and the consequence is that not one of these extracts is, in its composition, like another.

There exists only two special directions for the manufacture of extract of meat, the one in the Bavarian Pharmacopœia, the other in the Pharmacopœia Germanica, but these directions are not mine.—*London Phar. Jour. Nov.* 1866.

Munich, Oct. 22.

LIEBIG'S EXTRACT OF MEAT. REMARKS ON THE FOREGOING.

To the Editor of the Pharmaceutical Journal.

Sir,—The drift of Baron Liebig's letter in your last number will scarcely, we think, be intelligible to those of your readers who are not aware of what has been taking place in connexion with Extract of Meat; and we therefore deem it well to draw attention to some remarkable statements which that letter contains.

Baron Liebig tells us at the outset, that he has accepted the office of Director of the Scientific Department of Liebig's Extract of Meat Company Limited, and "on conditions calculated to offer to the public a complete guarantee of the genuineness and purity of the Extract manufactured by that Company." He further adds that he not only controls the manufacture in South America, but also, its quality when sold in Europe.

This is highly plausible: it is something like saying—"If you wish to have Extract that is genuine, buy it of the Company of which I am Director." But Baron Liebig goes on a step further:

"It is extremely difficult," says he, "as regards extracts of meat, the genuineness and purity of which is not discoverable by the eye, to protect the public against fraud; all manufacturers prepare their extract according to what they call 'Liebig's process;' but since I have given only general and not special directions for manufacture, it so happens that every one fills in the details after his own fashion, and the consequence is

that not one of these extracts is, in its composition, like another. There exists only *two special directions* for the manufacture of extract of meat, the one in the Bavarian Pharmacopœia, the other in the Pharmacopœia Germanica, but these directions are not mine."

Thus Baron Liebig not only claims to control the manufacture and quality of the Extract to which he refers, but implies that there is some secret essential to the process, suppressed in his published directions, but now imparted to the agents of the Company with which he has connected himself, and the formation of which was registered Dec. 4th, 1865. How far the spirit of this statement accords with what Baron Liebig published before the Company existed, we will leave others to judge from the following extracts:

"Since my experiments on meat in the year 1847 (*Annalen d. Chemie u. Pharmacie*, Bd. 62), I have constantly endeavored to promote the manufacture of Extract of Meat after the method I have described, in countries where beef has a lower price than with us.

Since the introduction into the Bavarian Pharmacopœia of this Extract of Meat (which must not be confounded with the so-called *Consomé* or *Bouillon tablets*), it has proved of great efficacy in cases of impaired power of assimilating food, etc.

* * * * * * * * * *

The introduction into Europe of Extract of Meat at half or one-third the present price, from countries where meat has almost no value, would be regarded as a real blessing to the population of Europe. I had directed the attention very earnestly to the manufacture of Extract of Meat in Podolia, Buenos Ayres and Australia, and was always ready to make known the method of preparation to persons who showed themselves disposed to become acquainted with it, and to assist them with my advice."*

These sentiments are worthy of a scientific man occupying the eminent position of Baron Leibig, and such as were to be expected of one so placed, and we have reason to believe that prior to the

* Translated from the *Annalen der Chemie und Pharmacie*, Bd. 133, (1865) p. 127.

formation of the Company with which he has become associated, Baron Liebig acted in entire accordance with them, for we find that under date 6 Oct., 1865, he thus wrote to Mr. Tooth of Sydney, who had shortly before had personal communication with him in Germany, and who was at that time engaged on some experiments on extract of meat in London:

"* * * * Allow me to tell you that you need not trouble yourself with finding out a new method, or a simpler one, for the preparation of the Extract of Meat; all this has been done a hundred times. There is only one method for manufacturing, —and this is to mix the chopped flesh with its volume of soft water (without gypsum), and to raise the temperature of that mixture to 180° F. To extract the essence with cold water is not applicable to manufacturing.

The South American Extract does not contain gelatine (or glue); it is precipitated by tannic acid, but this precipitate is not due to gelatine."

With regard to the special directions for *Extractum Carnis*, contained in the Bavarian Pharmacopœia (1856), which Baron Liebig says *are not his*, it is difficult to imagine that the words that we have put in Italics in the second pharagraph of the foregoing translation, were written with a consciousness that the directions in question were so far defective or different as not to yield "this extract," of which he is there writing. But be that as it may, it must at least be presumed that they had the sanction of his coadjutor Dr. Pettenkofer, who was a member of the committee responsible for the processes prescribed in that work.

Whatever Baron Leibig may mean by "*Special directions*," it is plain that *all needful directions* have long ago been fully made public. *Special directions* will be modified by special circumstances, such (among others) as the quantity of material to be operated upon, the nature of the apparatus employed, the climate of the country where the process is carried on, and other matters not involving any general principle;—and all extract of meat, fairly and intelligently manufactured according to Liebig's process is *cæteris paribus* identical, and may therefore, in our opinion, be properly designated *Liebig's Extract of Meat.*

Baron Liebig's present attempt to sell an exclusive right to

the use of a discovery which he had long ago given to the public, appears to be exactly parallel to a certain transaction *twenty years ago*, which called forth from the Editor of the Pharmaceutical Journal the following remark:

"Baron Liebig had an undoubted right to give the benefit of his discovery to whom he pleased; but having given it to the public, he could not make it private property afterwards."—*Pharm. Jour. Oct.* 1846, page 163.

We are, Sir,

Your obedient servants,

ALLEN AND HANBURYS.

Plough Court, Lombard St., 9 Nov., 1866.

—*London. Pharm. Jour. Nov.* 1866.

GLYCERIN.

BY JOSEPH ADOLPHUS, M. D., of Hastings, Michigan.

In writing this article, I am aware that but few are ready to receive the facts herein stated, inasmuch as glycerine has merely been regarded as a matter of but secondary import. It must not be considered out of place when I observe that glycerine stands next to cod oil as a restorative agent, *especially in the cases of children's complaints. What cod oil is to the adult, glycerine is to children;* at least, in a great measure. The clinical facts below recorded are from my own practice. I am altogether strongly inclined to the restorative doctrine, because I have reaped the richest harvest of curative success for practising it. Furthermore, I am not a firm believer in the doctrine, that the blood is the chief and only source of nutrition, repair, and reconstruction. However, I shall not digress further from my subject, but shall at some future period disclose my views on the latter subject.

Though glycerine has been before the profession for many years, I am not aware that that attention has been paid to this important remedial agent that its merits deserve.

Its excipient properties excel all other known solvents, because of its universality. Thus 100 parts of glycerine will dissolve

Acidum arsenicum,	20.0	Brucia,	2.25
" arseniosum,	20.0	Alum,	40.0
" boracic,	10.0	Arsenite soda,	50.0
" benzoic,	10.0	" potass.,	50.0
" tartaric,	30.0	Carb. soda,	99.0
" citric,	30.0	Carb. ammon.,	20.0
" tannic,	50 0	Chlor. potass.,	3.5
" oxalic,	15.0	Chloride sodium,	20 0
Argenti nitrat.,	100.0	" barium,	10.0
Bromine,	100.0	" zinc,	50.0
Iodide of iron.	100.0	Borate soda,	60.0
Chloride of iron,	100.0	Phosphorus,	0 3
Monosulph. potass.,	100.0	Persulphuret potass.,	25.0
Hydrarg. biniodide,	0.3	Muriate ammon.,	20.0
" bi-chlor.,	7.0	Sulphur,	0.3
" cyanid.,	27.0	Sulphate iron,	25.0
Iodine,	1.0	" zinc,	36.0
Iodide of sulphur,	1.6	" copper,	40.0
" potassa,	25.0	Mono-sulphuret soda,	100.0
" zinc,	50.0	" " lime,	100.0
Cyanide of potass.,	32.0	Muriate morphia,	20.0
Quinia,	0.5	Acetate "	20.0
Strychnia,	0.25	Sulphate "	20.0
Morphia,	0.45	Sulph. atropia,	33.0
Veratria,	1.0	" strychnia,	22.5
Cinchonia,	1.5	Carb. of iron,	60.5
Sulph. quinia,	2.75	Oxide of lead,	20.0
Atropia,	3.0	Salicine,	40.0
Nitrate strychnia,	4.0	Santonine,	35.0

All the deliquescent salts and vegetable acids are soluble in it to a great extent.

Chemically, glycerine is a compound of a radical known as *glyceryl*, having a formula of $C_6 H_7$, in union with 5 eqs. of O, and one of water; its formula is, therefore, $C_6 H_7 O_5 + HO$.

When pure, its specific gravity is 1.26, and contains 98 per cent. of anhydrous glycerine. When exposed to the air, it absorbs one-half its weight in water. It never absorbs oxygen, hence it never becomes rancid, when originally pure. It is not soluble in fatty acids.

When perfectly pure, glycerin is of a thick syrupy consistence, very nearly cororless, and without odor, and of a sharp sweet taste. Alone, it is not susceptible of fermentation. It is solu-

ble in all proportions in water and alcohol, but not in ether or chloroform. Pure glycerine evinces no reaction with litmus or other test-agents.

It is perfectly neutral and bland, and has the capacity of diffusing itself freely over and through organic matter, incorporating itself between organic molecules, by which it is absorbed and appropriated. All organic substances, from the hardest bone to the finest connective tissue, are penetrated by it, with such diffusive force as to make their minute structure astonishingly transparent. The blood and pus globules, when suspended in glycerine, become quite transparent, and show up their nuclei readily, their cell-walls becoming more thin and transparent, and finally dissolved. Epithelial structure is admirably delineated by its agency; so are the fasciculi of striped muscular fibre. Thin sections of bone, soaked in it, reveal in admirable style its corpuscles. All organic substances, soaked in glycerine, are thoroughly preserved, both as to form, integrity, and softness.

Applied externally to burnt surfaces, mixed with subnit. bismuth, it forms the very best application I have ever used for children or adults. One part starch (Bermuda arrowroot is best) and five of glycerine, heated up to 190° F., being constantly stirred, makes the most agreeable basis by which to apply nit. silver and other salts to the eye, ear, and skin. When spread over dried organic membrane, it diffuses itself rapidly over it, and is speedily absorbed into its intimate structure. This property of glycerine depends doubtless on the affinity that it possessses for organic molecules, penetrating to them and becoming a nutrient plasma to living tissue. When applied to false membranes, it diffuses itself between them and the morphological tissue beneath, causing their speedy detachment.

Thus in diphtheria I have repeatedly applied it with a brush, either alone or with tannin dissolved in it, to the false membranes, which would be detached in a few hours. So, also, in croup. The surfaces being so modified as in a great measure to cease to reproduce them. Burnt and blistered surfaces often produce false membranes, which induce severe constitutional symptoms, in consequence of the irritability of the surfaces. Glycerine and morphia speedily remedy them, soothing the nervous irrita-

tion, and modifying the vital condition of the parts. Applied to suppurating surfaces which are painful and produce an ichorous pus, glycerine-dressings change the abnormal condition by arresting the degenerating process, through its antiseptic and astringent properties. Applied to enlarged glands, and injected into abscesses, it meets every indication, either alone or with iodine, etc., dissolved in it. I have injected it into syphilitic buboes, bringing about a healthy state of their walls, and healing of their interior. I have used it as an application to the os uteri in ulcerations, indurations, and chronic inflammations of that organ, conjoined with iodine, or iod. potass., or morphiæ acet., or tannin, just as appearances seemed to require, with most excellent effects. Applied to large cervical glands in scrofulous children, with iodine, it dissipates them far more speedily than when the iodine is otherwise applied. Malignant ulcerations, touched with the following caustic are better remedied than when otherwise treated.

℞. Iodine,
Iod. potass., *aa* ʒss.
Glycerine, f.ʒviij. M.

When diluted with a larger portion of glycerine, and applied to carbuncles, buboes, and furuncles, in their formative stages, it will dissipate them altogether or modify them. Painted over abscesses of different types, it either causes the absorption of their contents, or checks in a measure their progress. Injected into the rectum in diarrhœa and dysentery, diluted with starch, it soothes the irritated mucous membrane in a remarkable manner, and will often alone bring about a cure.

But it is its internal usefulness in the treatment of children's diseases of low, cachectic, strumous, asthenic conditions, that glycerine displays its great superiority. I have repeatedly witnessed its capacity to fatten children. Thus: 1st. An infant six months old, recovering from a severe diarrhœa, kept quite emaciated and pale. Glycerine was ordered for it, and in a few days a change was remarked in its appearance for the better, and in four weeks it weighed eight pounds heavier. 2. A child, sixteen months old, had its head covered with one continuous scab—porrigo. This was a family complaint, and resisted all

manner of treatment for a very long time in all the other children. In the above case I resorted to glycerine, both internally and externally. A cure was effected in three months. 3. A girl, seven years old, recovering from rubeola, retained her cough, emaciation, and nervous irritability. Dulness over apex of left lung; roughened breathing. No doubt the case was chronic pneumonia. Glycerine, as a last resort, was ordered in teaspoonful doses in water, three times a day. Recovery in six weeks. 4. A strumous boy, much emaciated, had hacking cough and night-sweats. Pulse frequent. Sleep disturbed. Abdomen tumid and enlarged. Cervical glands swollen. Bowels irregular. Fecal discharges clay-colored. His case was such, that no one expected any more than a partial palliation. After other treatments had failed, I ordered glycerine in teaspoonful doses, in which were dissolved four grains of ferri ammon. cit., and one-half a grain of quinia, four times a day. This he continued for a year, and was in remarkably good health three years after.

Cod oil, quinia, and iron had failed in his case when the glycerine was commenced.

I always administer glycerine to children convalescing from typhus and typhoid fever, and find it to contribute so remarkably to their recovery and restoration, as to be observed by the non-professional. In cholera infantum I hardly ever fail to use glycerine, both as enemas and per orum. The great mortality of this complaint makes it well worth the attention of medical men, to any form of treatment that will tend to rob it of its fatality. The peculiar condition of the epithelium of the bowels, the great inanition and prostration, the nervous depression and exhaustion; all depending on the pathological condition of the mucous membrane of the small intestines, engendering an erythematous condition of the epithelial surface, and often resulting in shock to the nervous centers; and hurrying on death at an early period. Glycerine, from its affinity for molecular tissue, spreads over the surface of the intestinal membrane, supplies the deranged tissues with a plasmatic element of repair, as well as by its mechanical and endosmotic powers, on living tissue, changes the local life forces, and endows them with renewed vital capacity. This is not fancy. Observe its action on the inflamed

skin, and we shall soon be satisfied of the justice of the above remarks. Glycerine rubbed on the abdomen also gives it to the exhausted tissues in another manner. All I ask is its trial in infantile diarrhœas with judgment.

It forms an excellent adjunct to cod oil, in proportion of equal quantities. Quinia dissolved in it seems to act more rapidly, kindly, and with greater certainty, often entirely overcoming idiosyncracies. Thus an infant, on whom quinia exercised a very severe effect, could take it dissolved in glycerine with perfect safety. It adds to the efficacy of iron. Thus a boy twelve years old had made a bad recovery from a billious remittent fever. He was pale and feeble, nervous system irritable; anorexia was a marked symptom. Iron, cod oil, and tonics failed on him. He was then put upon glycerine f. ʒj. and tr. ferri. chlor. gtt. viij. three times a day. His recovery was rapid and permanent.

A girl, æt 14, was treated for irritative dyspepsia for nine months, without any material improvement, when glycerine was ordered in teaspoonful doses, four times a day, with excellent results, and a final cure. Many grown people are greatly benefited by uniting cod oil and glycerine in equal proportions, and I have always found that children do better, while taking cod oil, to have some proportion of glycerine added to it.

Furthermore, I cannot close without observing that old and irritable ulcers are most excellently treated with glycerine holding acetate of morphia in solution. That burnt surfaces are relieved of pain in proportion as the glycerine penetrates to the sound tissue beneath. When stumps suppurate, and thepus burrows into the sound tissue, pure glycerine arrests the process, and brings on a healthier condition of the parts. In a case of psoas abscess, glycerine diluted with its bulk of water was injected into it twice a day, and was gradually made stronger, till a cure was effected.

Glycerine is well worthy of our attention, I prefer BROWN'S glycerine.—*The Med. and Surg. Rep.*, Phila., *Jan.*, 12, 1867.

THE BORAX LAKE AND SULPHUR BANKS IN NAPA VALLEY, CALIFORNIA.

CALISTOGA SPRINGS, NAPA VALLEY, CAL., Oct, 1866.

The Napa Valley, in California, is about forty miles long from north to south, and averages nearly two miles in breadth. For the most part, the valley is as umbrageous now as before its cultivation; the beautiful oaks with which it was studded still remaining. The first settlers of California had not before them dense forests nor treeless plains; but a country which, when viewed from the mountains, presents the appearance of an English park.

At the entrance to the valley is a soda spring, the waters of which are bottled and used throughout the country. In the middle, among sequestred and woody hills, there are the White Sulphur Springs, with a hotel and cottages, to which many invalids resort with advantage; and here, in the upper part of the valley, are hot and sulphur springs. This is Calistoga—a fancy name for a place which will become magnificent. Mr. Brannan, its public spirited proprietor, a pioneer among the pioneers of the State, has expended a fabulous sum in planting trees over the shallow, heated soil, beneath which boiling water flows in every direction, some of its streams being highly charged with sulphur. Success is rewarding his efforts, and all that is needed to make Calistoga a Saratoga—shady walks—is being accomplished. Stages leave Calistoga daily for the geysers, which I have just visited.

MOUNT ST. HELENA.

Before beginning the ascent of Mount St. Helena, which bounds this valley on the east, you pass a depot of borax and sulphur, where those commodities, after being transported across the mountains in teams of six mules, carrying six tons, are transferred into teams carrying ten tons, drawn by eight mules, to the railway for shipment in steamers to San Francisco. The excellent road, just completed, which is carried on the steep acclivities of the mountains, by the side of precipices a thousand feet deep in some places, has been constructed purposely for the conveyance of those valuable minerals. Mount St. Helena,

whose peak is one of the loftiest of the coast range, having an altitude of three thousand six hundred feet, has been pressed by the feet of the illustrious Humboldt, who left a monumental inscription there which some barbarian—not a Digger Indian—has removed.

VALUABLE SPRINGS.

The most remarkable feature of the country in Cayote Valley is a hill of ochre, through which a creek makes its way. On arriving at Lower (Clear) Lake there was a sufficient time for a visit to Sigler's Springs, which lie seven miles distant on the same mountains as the geysers, though on the opposite or western side. The picturesque and secluded valley in which these, the most valuable of the springs of California, are found, has the advantage of being well watered, and, unlike any other portion of the State, is in perpetual verdure. Besides a natural fountain, whose waters cannot be distinguished from Congress water, there are hot sulphur and ferruginous baths supplied by springs whose suppl, is illimitable. A rude edifice, serving as a rudimentary hotel, has been erected by the proprietor, who personifies Galen and Boniface, and very well too, all things considered. Mounds of tuffa, enormous masses of trachyte and serpentine, with veins of cinnabar, in this hitherto unexplored valley, invite a visit from geologists. Were this place not so difficult of access, it would be thronged with visitors from all parts of the Pacific States.

BORAX LAKE.

Returning to the lower part of Clear Lake—a magnificent sheet of water twenty miles long and from two to ten in breadth—we resumed our journey to its objective point, Borax Lake; not, however, until we had first seen evidence of the volcanic character of the country by traversing hills covered with obsidian, and by having a glance at springs from which carburetted hydrogen issues in quantities sufficient for illuminating purposes, if wanted.

Borax Lake is about one hundred miles north of San Francisco. Properly speaking, it is a pond, being only one mile long and half a mile wide. It is situated on a peninsula which juts into Clear Lake, from which it is separated by a mountain. It

is, in brief, a crater of an extinct volcano, or at least presenting that appearance. That my reader may duly appreciate the rarity of the curiosity before him, I would remind him that probably no white man ever saw its like—there being no other of the kind save in Thibet. Before the discovery of Borax Lake in California, there were but two sources of supply of borax to meet the demand of the world:—that of Thibet, and that of a firm in Liverpool who manufacture the article by a chemical process.*

Iron coffer dams, having chambers about five feet square, are sunk in the lake; the water is bailed out of the dams, the mud in them being pressed by men stamping on boards that cover it, and the concrete mass taken ashore and dried in the sun, the largest borax crystals being picked up during this operation. Crystals are found from the size of a hen's egg to that of a pea. The earth is strongly impregnated with borate of soda—biborate, strictly speaking—is subjected to lixiviation, and the saturated water is slowly evaporated in heated boilers until the octahedral crystals are formed. In the sediment are iodine, silicic acid, silicate of lime and alumina; the first is likely to prove valuable. At the present time about four thousand pounds of borax is obtained daily; ten to fifteen tons will be the daily yield on the completion of the works. The supply may be regarded as illimitable, and sufficient for the demands of the world. It is constantly forming, and soon there will be no borax in use in the arts and in medicine save that which the Golden State will furnish.

SULPHUR BANKS.

A hill about six hundred feet high separates Borax Lake from the sulphur banks. The view from the pass over that hill is one of surprising beauty and grandeur. A lofty mountain, the Uncle Sam, in front, sections of Clear Lake, like two silvery arms embracing the borax peninsula, and the tiny mineral lake itself reflecting the landscape more distinctly than could a metallic mirror, are but a few of the attractions of this charming spot. There is no human habitation in sight save the works of the Bo-

* The author forgets the lagoons of Tuscany.—Ed.

rax Company, but cattle are browsing on the salt meadows adjacent to the lake, and on its borders are swine feasting on the larvæ of a fly, which is found on the margin, forming an organized belt a yard or more wide, and about a foot in depth. The only other inhabitant of those waters is a leech. It is hardly necessary to add that the specific gravity of the lake renders it impossible that a man should be drowned in its healing waters—healing the ulcers of animals that are driven in for that purpose.

The sulphur banks are on the margin of Clear Lake; an extensive deposit—the deposition being still in progress. Extensive works for sublimating the element have been just completed. Sulphur is poured out from retorts in constant streams into boxes holding two hundred pounds each, affording to the borax company, at a trifling expense, a daily supply of a hundred such boxes, if they see fit to draw on their brimstone bank to that extent.

SODA.

Here we may have an insight into one section of Nature's laboratory. Would you learn how bicarbonate of soda is formed in Borax Lake? Scoop out of this pool some of its water, which is charged with carbonic gas; first quaff some of the delectable fluid, and pour it into yonder pool of boracic acid—a pleasant palatable liquid—and mark the effervescence! The brisk action now going on is due to the fact that boracic acid has a strong appetite for soda, while carbonic acid is only too ready to get rid of that alkali; two portions of boracic acid seize the forsaken soda and form borax, while divorced carbonic acid bubbles up as if rejoicing in its emancipation. That is what causes the commotion in the pool, and that is precisely the operation which is taking place in Borax Lake.

CRYSTALS.

Walk into one of the trenches that have been dug in the bank of sulphur, and you may watch the formation of beautiful circular crystals of sulphur from the condensation of the stifling vapors around you. These crystals fill little crevices, wherein you will discover cinnabar and opal. You are admonished not

to stoop, for the carcasses of hares and pigeons indicate that streams of carbonic acid are flowing in this trench; and, indeed, turn where you will, you are well-nigh overpowered by sensations as if naught but mephitic vapors could be inhaled in this desolate little bog. The desolation is, however, circumscribed, for beyond the limited sulphur area there is luxuriant vegetation, from the beautiful campana which marks the spots where boracic acid mixes with the waters of Clear Lake to the pine-clad summits of the mountains. The ever-present oak (*Quercus Nindsii*), the Madrona (*Auburtus Menziesii*), the Manzanita (*Arctostaphylos glauca*), and other California forest trees, form a grove hard by, among which I recognized, as a sort of old acquaintance, the California nutmeg, that graceful evergreen bearing the honored name of one of my preceptors. —*The Torreya California.*

QUICKSILVER.

The borax and sulphur works are the property of one company, which has been so fortunate as to secure the services of Professor Oxley, an English chemist, to whom is due the credit of developing these mineral resources of Clear Lake. It is not unlikely that quicksilver will yet be found a paying article in this neighborhood. Already California quicksilver has driven out of the Chinese, Chilean, Peruvian, Mexican and our own market the quicksilver of Spain, and the indications are that innumerable mines remain to be discovered.

LABOR.

But for Chinese labor neither borax nor sulphur could be obtained. White laborers could not be induced to undertake the labor. However, as Chinamen get what they consider good wages, the needful supply is always on hand. Professor Oxley's experiences in mining are highly suggestive as to man's need of a Sabbath. He says he has seen, at Washoe, enough of working seven days in a week on seven days' wages to demonstrate that only five days' product is the result; and although his Chinese laborers are engaged by the month, and are quite willing to work every day in the month, he, for pure

economical and physiological considerations, gives them a seventh day rest,—the Christian Sabbath.

D. J. MACGOWAN.

—*Journ. Applied Chemistry*, Jan., 1867.

THE QUININE DISTRICTS OF THE ANDES.

The official report on the efforts of the Indian Government to introduce the quinine plant in the mountainous regions of India, to which we drew attention in a previous number, contains also a very interesting account of the culture, climate, and habitat of the cinchona plant of South America. Mr. C. R. Markham of the India Office, in a memorandum which he submitted to the Indian Government, stated that he considered it to be very important that seeds of the species which grow in New Granada, being hardy, and yielding a large percentage of quinine, should be obtained for propagation in India; and the Secretary of State made arrangements with Mr. Cross for this purpose. That gentleman accordingly made a tour of the Andes, and passed through districts which had not been previously explored, for it appears that even Humboldt, who visited Popayan, did not penetrate many of the forests which were visited in this search for seed. The official notice of the work performed states that Mr. Cross had to face dangers and hardships of no ordinary kind, which proved fatal to the object of his first mission, as the seeds he had collected were destroyed; but a renewed visit, made at the instance of the India Office, was more successful. At the time of receiving his instructions, Mr. Cross was residing near the Red Bark Forests, on a high table-land on the western slopes of Chimboraza, at an elevation of 10,000 feet above the level of the sea, and from this district he commenced his ascent of the northern shoulder of the Chimboraza, and reached the highest part of the pass, which has an elevation of nearly 15,000 feet. After passing through districts where barley and potatoes were cultivated, he came upon an edible species of *Oxalis*, and then reached immense tracts of land covered by a species of *Stipa*, which with genti-

ans, *Chuquiragua insignis*, and other plants of the order *Compositæ*, ran up to the very verge of perpetual snow. Passing along a road, hedged on each side by monstrous specimens of *Agave Americana*, he came to the snow-covered cone of the volcano Cotopaxi, from which a perpetual rumbling noise is heard, and which sends up flame to a height of 1,000 feet above the summit of the crater. Our traveller next passed the borders of the Laguna de San Pablo, which was surrounded by tumuli, some of which were of the extraordinary height of 400 feet, and thence to the plain of Tuquerres, which, at a height of 10,500 feet, produces a *Barnadesia* with white flowers, and where a dwarf species of gentian was in full bloom, covering the ground as thickly as daisies do in a pasture field in England. At Pasta he came to a district which has a wild temperature, being surrounded by forest-covered mountains, where a species of *Cinchona* is cultivated, chiefly for export to the United States. Pasta is also a market for vegetable dyes, which are brought there by the Indians. There was much cinchona bark stored up at this place, and also in sheds in the forests; but as its yield of quinine was small, it did not sell readily. The bark had a yellow or orange color, and in the fracture was coarse and fibrous. Mr. Cross describes the tree producing it as the *Cinchona lancifolia* of Karsten, being of great size, with large lanceolate coriaceous leaves and bark, covered with silvery epidermis. After passing through a series of adventures of no ordinary kind, Mr. Cross arrived at the city of Popayan, which lies between two volcanoes, at nearly 6,000 feet above the sea. He next reached Sylvia, the head-quarters of those who buy the bark of Pitayo, Hambola, Tortoro, and Purrace. Passing on to Pitayo, some choice plants were discovered, and here Mr. Cross selected seed from trees about fifteen feet high. He remarks that the color and depth of the soil varied from light brown to nearly black, and was from three inches to three feet in depth. In all situations the vigor of the cinchona plant appeared the same, but it was restricted to the dry slopes, and was never found on wet ground. After drying the capsules, he occupied himself in taking the temperature of the region, and he found that at the lowest limit of

the cinchona it rose during the hottest days to 59° or 60°, but at night fell to 46° or 48°, and at certain periods below freezing point; at the upper limit, the temperature ranged during the day from 40° to 48°, and at night fell to 35° or 36°. Hence it would appear that in dry situations it favors the plant to have an occasional fall in the temperature of three or four degrees below freezing point, and a daily range of from eight to twelve degrees.

The general vegetation of this region consisted of pipers, solanums, brugmanzias, fuchsias, smilax, etc. The winds, which in summer are often violent, do not appear to affect the cinchona, but the forests are very rarely enveloped in mist. It appears to be a delusion, therefore, on the part of those persons who assert that torrents of rain and mist are necessary for its growth. Mr. Cross states that "he had been in localities in the Andes which had altitudes similar to that of the cold cinchona region, where only a species of *Solanum* would grow, and which looked as if on the point of extinction, from the abundance of mosses which twined round the smallest shoots to the points. No cinchona could live in such a climate, a certain amount of dry weather being necessary for ripening the capsules." It appears that all the bark taken from Pitayo is sent to France, and that the bark sold in England under that name is not true Pitayo bark, but comes from the mountains which border on the valley of Magdalena, from Almaquer and Pasto. Mr. Cross states that the spurious Pitayo bark of the English market is from the *C. lancifolia* of Karsten, and is very inferior in quality to that of "Pitayo, the latter being not much thicker than window-glass, being taken from small plants; the large trees having been destroyed long ago." Mr. Cross then continued his journey to the great valley of the Magdalena, the town of Neyva being the principal emporium for the bark of the district; and thence he returned to Paramo, having accomplished a difficult and interesting journey, during which he collected a vast amount of information, which cannot fail to be of great practical importance to cultivators of this valuable plant. Viewed merely as a geographical exploration, this journey over a considerable portion of the Andes cannot fail to

attract the attention of scientific men, and Mr. Cross's remarks on the vegetable productions of this vast region must interest botanists and chemists. Mr. Clements R. Markham, in his official memorandum, states that "Mr. Cross deserves great credit for the skilful and energetic way in which he performed this difficult service." It appears that a portion of the seed obtained has been supplied to the Mexican Government, who are anxious to cultivate the cinchona plant.—*London Chemist and Druggist*, Dec. 15, 1866.

NOTE ON THE CRYSTALLIZATION OF GLYCERIN.

By William Crookes, F.R.S.

My attention has been drawn by my friend Dr. W. S. Squire, of the firm of Burgoyne, Burbidges and Squire, Coleman Street, to the hitherto unobserved fact of the crystallization of large masses of glycerin during the recent cold weather.

About five tons of glycerin, in casks of eight cwt. each, were recently imported by this firm from Germany. When they left the factory the contents were in their usual state of viscid fluidity; but, on arriving in London, they were found to have solidified to a solid mass of crystals, so hard that it required a hammer and chisel to break it up.

A large block of this solid glycerin, weighing several hundredweight, suspended in a somewhat warm room, took two or three days to liquify, and a thermometer inserted in the fusing mass indicated a constant temperature of 45° F. In small quantities the crystals rapidly fuse when the bottle containing them is placed in warm water. The original glycerin was pale brown; the crystals formed from it are nearly white, whilst the liquid which drains away from it is dark brown. In quantity, the solid glycerin looks very like a mass of sugar candy. The isolated crystals are sometimes as large as a small pea; they are brilliant, and highly refracting; when rubbed between the fingers they are very hard, and they grate between the teeth. Their form appears to be octahedral, but this is difficult to ascertain accurately, owing to the viscidity of the mother liquor which adheres to them.

The crystals, separated as much as possible from the mother liquor, and then fused by heat, form a clear and nearly colorless liquid, slightly more viscid than usual, which, as far as I have been able to ascertain, possesses all the physical and chemical properties of pure glycerin. It is perfectly miscible with water and alcohol. It has been especially tested for sugar and glucose (common adulterants) with negative results: lead is also absent, and nitrate of silver only produces slight turbidity in its aqueous solution. I believe it to be almost chemically pure anhydrous glycerin.

Some of the fused crystals have been exposed for several hours to a temperature of 0° F. without solidification taking place. The only result was that the liquid became more viscid.

The cause of the crystallization is not very clear. The most probable explanation is that the vibration of the railway journey across Germany, added to the intense cold to which the glycerin was simultaneously subjected, enabled the particles to arrange themselves in a regular form. The phenomenon then becomes analogous to the crystallization of wrought iron under the influence of vibration, the gradual solidification of syrupy solutions of organic alkaloids, and the familiar crystallization of refractory platinum salts in a watchglass by judicious friction with a stirring rod. Experiments are about to be tried to see if the crystallization of glycerin can be determined by exposing it to a low temperature, and at the same time setting the particles in a state of vibration.

Should the above view of the cause of this curious phenomenon be correct, we may imagine that, during the railway transit, the vibratory movement was determining at the same time the crystallization of the glycerin and the railway axles, the rapidity of the action being in the inverse ratio of the viscidity of the two bodies.—*London Chem. News, Jan.* 18, 1867.

ON THE POISONOUS CHARACTER OF NITROGLYCERINE.

In the 'Hanoverian Journal for Practical Surgery and Medicine' (*Zeitschrift für praktische Heilkunde und Medicinalwesen*, heft i.) there is an article by Mr. B. Schuchardt on the injurious

effects of nitroglycerine upon men and animals. Among the higher animals he found that it acted chiefly on the brain, and in large doses caused death. In order to study its effect upon himself the author took one drop at 10 A. M.; five minutes after great giddiness came on, accompanied by weakness of sight, headache with throbbing in the temples, weariness, sleepiness, strong aromatic taste in the mouth, a burning feeling in the throat, and pain in the region of the heart. An hour later, whilst incautiously endeavoring to take some nitroglycerine out of a bottle by means of a tube, he received a considerable quantity in the throat. Although he spat it out at once, and rinsed out his mouth with alcohol, he felt the above-described symptoms return, so that he was obliged to go to bed. He then fell into a half-senseless condition, which lasted some hours, and left behind a violent throbbing headache, with sensitiveness to light, giddiness, and trembling in the whole body. At first a feeling of warmth spread over the whole system, and the pulse increased in speed; later a feeling of cold came over him; besides this there was a burning sensation in the region of the heart, and nausea, but no vomiting. On the following day every symptom of poisoning had disappeared. There was no sign at all of convulsions.

When applied externally, nitroglycerine produces no effect at all; to have any action it must be absorbed into the blood. This seems to show that its poisonous effects are due to the products of its own decomposition. Perhaps protoxide of nitrogen is set free in the blood. As the blasting oil has the property of penetrating through organic tissues in a very marked manner, it is easy to understand that workmen handling the material should get headaches by the absorption of it through the skin. As nitroglycerine is not volatile, no action through the lungs can take place.

As the excellence of nitroglycerine as a blasting material is sufficiently proved, it will not be long before it finds a wide application. Then will come the question whether its poisonous properties are not so considerable as to forbid its employment. The author of the article referred to believes, from his researches, that this is not the case. Experiments on animals have shown that, to cause death, comparitively large doses are necessary.

It is true that upon man small quantities produce decided symptoms of poisoning, but, even after a somewhat large dose, these were not of such an alarming character as to cause any apprehension of a fatal termination. The author got about a hundred drops in his mouth and swallowed at least ten. Violent symptoms of poisoning came on, but not such as to cause anxiety about his life. In the arts and manufactures far more dangerous poisons are employed, such as phosphorus, cyanide of potassium, and corrosive sublimate. However, in consideration of the injuriousness of nitroglycerine, some precautionary regulations for its manufacture and sale should (in the author's opinion) be adopted. Besides this, the workmen should be taught the dangerous nature of the blasting oil, in order to prevent their injuring themselves by carelessness in handling it. If these means were taken, it is thought that nitroglycerine would scarcely be found more injurious than any of the other poisons used in the arts and manufactures.—*London Pharm. Journ., July,* 1866.

ON THE PREPARATION OF PURE SILVER.*

By Professor J. S. Stas.

I have had recourse to two distinct methods to procure the pure silver necessary for the different purposes treated of in my investigations.

First Method.—To carry out the first method, I dissolved at the boiling point 3500 grammes of French silver coin in very dilute nitric acid. The nitrate of silver produced, after having been evaporated to dryness and fused, was kept at its point of fusion as long as oxygen compounds of nitrogen were given off. The nitrate mixed with nitrite was dissolved when cool in the smallest possible quantity of cold water, and the solution, after resting forty-eight hours, was filtered through a double filter to separate all the matter that might have remained in suspension. The limpid solution, diluted with thirty times its volume of filtered rain-water, was precipitated by an excess of pure hydrochloric acid. The chloride of silver formed was, when deposited, washed

* Abstract from *Memoirs of the Royal Belgian Academy.*

by decantation, first with water acidulated by hydrochloric acid, and then with pure water. This washing was performed by shaking the chloride violently each time in large stoppered bottles with the necessary quantity of liquid.

It was then spread upon a cloth that had been washed with hydrochloric acid, strongly compressed, and left to dry spontaneously. When perfectly dry it was finely powdered and digested for several days in aqua regia. It was then again washed in distilled water.

As the reduction by heat of chloride of silver with carbonate of sodium is a most delicate operation when performed upon large quantities, I made this reduction at a low temperature under the influence of a solution of caustic potash and sugar of milk, as first proposed by Levol.

To procure potash and sugar of milk free from heavy metals, I added to a concentrated solution of hydrate of potassium, previously boiled, a slight excess of a solution of sulphydrate of potassium to precipitate traces of dissolved metals. After the deposit of the metallic sulphides, I decanted the alkaline solution and put it in contact with freshly precipitated oxide of silver to deprive it of the sulphydrate of potassium. After a sufficient digestion and rest, I separated the excess of oxide of silver and the sulphide of silver that had been produced.

By the same means I eliminated the heavy metals contained in an aqueous solution of sugar of milk.

The chloride of silver, distributed in three large porcelain jars, was digested at a temperature of from 70° to 80° C., with the mixture of solutions of hydrate of potassium and sugar of milk, until all the chlorine was separated from the silver. The metallic silver, which was grey, was washed with water until the excess of alkali had disappeared, then digested with dilute pure sulphuric acid, and lastly washed with ammoniacal water. After being dried, 5 per cent. of its weight of calcined borax was added, containing 10 per cent. of nitrate of sodium, and then, with the necessary precautions, it was fused in a "Paris crucible."

The fused metal was then poured into a mould coated with a paste of mixed calcined and non-calcined kaolin. The bars of silver, first cleaned with sharp sand, were then heated to red-

ness with caustic potash from tartar; the adhering kaolin having been dissolved, the bars were washed in pure water.

They were divided into small blocks by means of a chisel of tempered steel. As the hardest chisel leaves traces of iron on the surface of the silver, the small blocks were digested with warm hydrochloric acid, pure and concentrated. The silver was then washed with ammoniacal water, and lastly with water, and heated up to its fusing point before being placed into a well stoppered bottle.

I procured, *at a single casting*, 2875 grammes of silver of an extraordinary whiteness.

I will subsequently state how I assured myself of its state of purity; I wish first to describe the second method which I made use of to procure large quantities of pure silver.—*London Chem. News, Jan.* 18, 1867.

EXPERIMENTS ON THE COMPOSITION OF WHEAT GRAIN.

By A. H. Church, M.A. Oxon., F.C.S.
Professor of Chemistry in the Royal Agricultural College, Cirencester.

The influence of season, climate, manure, etc., upon the composition of wheat grain, has engaged the attention of many scientific observers. MM. Boussingault, J. Pierre, and Reiset, abroad, and Messrs. Lawes and Gilbert, in this country, have added several important facts to our knowledge of the variations in the yield and quantity of corn under different conditions of culture and atmospheric influence, and also according to the particular variety of seed grown. There were still several points to be cleared up, and it is to one among these that my attention has been more particularly directed since the autumn of 1863. It is the relation of the density of the seed to its chemical composition, and to its germinating and productive powers, that I have submitted to an experimental investigation. The first portion of my results has been already published,* and a brief account of those more recently obtained may prove of interest to the readers of the "Journal of Botany."

Most samples of dressed wheat-grain, if carefully examined,

* "Practice with Science," part i. p. 101. Longman, 1865.

will be found to consist partly of hard, horny, subtranslucent grains, partly of softer opaque floury grains, and partly of grains presenting a mixed aspect. I have specially examined two varieties of wheat, and the proportions of the three sorts of grain which my samples contain are given here in percentages:

	Spalding red wheat (1864.)	Hallett's white rough chaffed (1865.)
Translucent . .	49 per cent.	24 per cent.
Medium . .	34 "	31 "
Opaque . .	17 "	45 "

These proportions fluctuate, however, even with the same variety of wheat under the various conditions of season, maturity, when cut, etc. It is not, however, these proportions that I wish to discuss, but a remarkable difference in composition between the translucent and the opaque grains. I am aware that previous observers have detected certain chemical differences between the poor shrivelled grains and the full plump grains. But the grains which I find to offer a most striking contrast as to the proportions of their most important constituent, present no striking contrast in size, shape, or weight. In Hallett's white wheat, for instance, the 24 translucent grains weigh 19 grs.; the 45 opaque grains weigh 34·2 grs. Had the opaque grains been of exactly the same density and size as the translucent grains, their weight would have been 35·6 grs. instead of 34·2—a very trifling difference, due not only to a difference in the size of the two sorts of seed, but to a slight difference in density in favor of the translucent grains. This difference in density is brought out very plainly when the seed is placed in a strong solution of chloride of calcium under the air-pump. With the solution of specific gravity, 1·247, 71 per cent. of the grains sink, 29 per cent. float. In 100 of the heavy grains thus separated there are generally 35 to 38 translucent grains, and only 18 opaque; while in 100 of the light grains thus separated, there are usually only 10 translucent grains, and as many as 70 opaque grains. With these observations on one physical distinction of importance between the two sorts of seed, I may introduce my experiments on their chemical differences.

The amount of water in the selected seeds was practically the same:—

Percentage of Water.

	Spalding red.	Hallett's white.
Translucent	16·12	14·34
Opaque	16·10	14·47

But the percentages of nitrogen were remarkably different :—

Percentage of Nitrogen.

	Spalding red.	Hallett's white.
Translucent	1·792	2·088
Opaque	1·405	1·521

It is usually assumed that the percentage of "flesh-formers" or albuminoids in feeding-materials may be deduced from the percentage of nitrogen by multiplying it by 6·25. According to this calculation, we find the percentage of albuminoids in the translucent grains of Hallett's white wheat to be 13·06, while in the opaque grains it is only 9·51. In Spalding red wheat, the flesh-formers in the translucent grains amount to 11·20 per cent., and to 8·78 per cent. only in the opaque grains. Assuming the medium grains to be intermediate in composition, it is easy to calculate what amount of nitrogen the whole wheat would contain. The calculated and experimental percentages of nitrogen are—

	Spalding red.	Hallett's white.
Percentages of nitrogen calculated	1·598	1·745
" " "	1·600	1·752

The chief conclusions at which I have arrived from my experiments previously published, from those recorded in the present note, and from others not yet made known, may be briefly summed up as follows :—

1. In a sample of wheat the translucent grains contain much more nitrogen than the opaque, but the same percentage of water.

2. The translucent grains are denser than the opaque.

3. A larger proportion of the opaque than of the translucent grains germinates and fruits.

4. The yield of dressed corn is greater from the denser seeds, and this dressed corn, from the greater perfection of its grains, is itself denser.—*London Pharm. Journ., March* 1, 1866, from *Journal of Botany.*

KERR'S SOLUTION OF PERNITRATE OF IRON.*

By T. and H. Smith.

Many pharmaceutists, as well as ourselves, must have found the process for preparing Kerr's solution of pernitrate of iron very unsatisfactory, from the unstableness of the product yielded; in a longer or shorter time it begins to lose its transparency and becomes unsightly, or through the production of nitrous gases of a more or less condensible nature the stopper may be thrown out or the bottle burst.

Kerr's solution being made by the action of nitric acid on metallic iron in the cold, contains a varying proportion of protoxide of iron, depending upon variations of temperature and other circumstances; hence arise after changes. Lower oxides of nitrogen and possibly even free nitrogen may be produced from the continued action between the protoxide of iron and nitric acid; part of the nitric acid being thus destroyed, the quantity necessary for the solution of the metallic oxide becomes deficient. In this way gases are liberated, and—from the production of a basic compound—the liquid becomes cloudy. It cannot have been intended that the compound should be a protopernitrate, such a preparation being a medicine, whose components are in a state of gradual change; further, the British Pharmacopœia views it as a nitrate of the peroxide. With a view to remedy these inherent defects, we were led to adopt a method which has for a considerable time been satisfactorily prosecuted. We have little doubt that the process may have already occurred to some, and may have been advantageously applied by them. With the hope, however, that an approved method would not be unacceptable to such as have experienced the uncertain results of the recognized formula, we publish the following process:—

In making Kerr's solution, instead of acting directly on metallic iron with nitric acid, we dissolve the pulpy precipitate of per-

* The authors do not appear to be familiar with the solution of the U. S. Pharm. made by forming a protonitrate from a given portion of nitric acid and peroxidizing it afterwards by the proper addition of NO^5. The process has been used here for ten years, and affords a permanent solution.—Ed. Am. Jour. Pharm.

oxide in the proper quantity of nitric acid, diluted with water, so as to produce the necessary measure of 30 fluid-ounces for each ounce of metallic iron.

Supposing 60 fluid-ounces the quantity to be prepared; make a solution of perchloride of iron, according to the direction of the British Pharmacopœia, dilute with 2 or 3 gallons of cold water, and add ammonia or a weak solution of carbonate of soda till the precipitation is complete. The precipitate having subsided, wash by decantation or siphoning till completely free from saline taste. As the oxide of iron, after entire subsidence, contains too much water, the excess must be removed by pressure in a cloth, so that the remaining pulp may not occupy more space than about 30 ounces.

The solution of the oxide of iron may now be easily made; dilute the acid to within a little of 30 ounces, introduce the pulpy mass gradually, with constant stirring, and bring the whole to the proper bulk.

A simple method of accurately arriving at the proper quantity is to measure into the vessel, before use, 60 ounces of water, and mark with a slip of gummed paper the level of the liquid. In order to avoid the risk of the formation of a basic compound (which the after addition of acid might fail entirely to dissolve), it is preferable to add the oxide to the acid than the reverse.

56 parts or 2 eq. of iron require 3 eq., or 162 parts of absolute nitric acid.

For 2 oz. of iron we find by proportion—

56 : 162 : : 437·5 × 2 : 2531 parts of nitric acid necessary.

Let 80 per cent. of anhydrous acid be present in the acid used, and the requisite quantity will be—

80 : 100 : : 2531 : 3164 grains, or, as the measure is inversely as the density—1500 : 1000 : : 3164 : 2109 water grs., or 4·82 fl. oz., or 4 oz. 6 drs. 33 ms.

As it is advisable to have a slight excess of acid in the pernitrate solution, one or two drachms more than the calculated quantity should be used.

Following rigidly the process given in the British Pharmacopœia, we have been unable to obtain a preparation giving no precipitate with ferridcyanide of potassium.—*London Pharm. Journ.*, *November*, 1866.

WHOLE-MEAL BREAD.

Sir,—I read with much satisfaction, in the 'Pharmaceutical Journal,' the report on Professor Church's experiments on wheat. It is a subject in which I take very great interest, seeing that wheat constitutes so large a portion of human subsistence. He says "dressed wheat," so that I am not sure whether he means wheat with or without its branny covering. The translucent grain (Russian) contains more gluten, and consequently more nitrogen. It is for this reason that Odessa wheat (the paste being much more tenacious and every way better when cooked) is preferred in Italy for making maccaroni, vermicelli, and the like paste.

In cold and rainy seasons, the yield of gluten, and therefore of nitrogen in wheat is very greatly reduced. Very many years ago, I recollect that the wheat, during such a season, contained little or no gluten, and resultantly little or no nitrogen. When made into griddle bread or cakes, the sides collapsed or closed until they came into absolute contact, greatly to the distress of the poor suffering people who knew not *the reason why*. Bakers empirically mix foreign with home wheat, because the foreign contains more gluten, and thence makes better and more nutritive bread. In warm summers and in warm climates, generally, the wheat is more glutinous. I have observed buyers in the markets here chewing a little wheat so as thereby to ascertain rudely the amount of the gluten. They did not know anything about gluten as such, but they knew, in a general way, that stickey wheat—wheat that left a good residue when chewed, and the starch was washed out of it—made superior bread. It is by reason of this superiority of foreign wheats, that they come to be mixed with our domestic wheats in the preparation of bread. In fact, British wheat alone will not commonly make good bread. I have examined Russian wheat, a small shabby-looking transculent grain, that yet made beautiful bread,—far better, indeed, than that resulting from plump, magnificent-looking English wheat. What I want to see everywhere, however, is the preparation of *whole-meal bread*—bread including the bran, with the bran-gluten and the bran-phosphates, so all-essential to good

bread and the nurture of our flesh and bones. But I do not think that the working classes, to whom it is so very important, will ever take to it fully until set the example by the more instructed classes, who yet themselves require instruction in this matter.

I am, Sir,

HENRY M'CORMAC, M. D.

Belfast, May 30, 1866.

London Pharm. Journ., July, 1866.

ON A NEW MACERATING APPARATUS.

By Mr. R. W. GILES.

The unostentatious arrangement exhibited before the Conference, for the more convenient exhaustion of vegetable substances in a minimum quantity of water, having proved very satisfactory in the preparation of infusum cinchonæ spissatum, and other allied liquors of ordinary and extensive use in pharmacy, I have thought it worthy of a few remarks at the present meeting. I do not desire to see Pharmaceutical Chemists become manufacturers, but I strongly believe that the *natural* mode of advancing the practice of pharmacy amongst *the many* in our profession is to give them a practical interest in the processes of the art, beginning with the most simple; and that the communication of simple forms of apparatus which will have the advantage of rendering ordinary processes easy and profitable, is one of the best means of attaining this object. I may take this opportunity of saying that the establishment of a Museum of Pharmaceutical Apparatus at Bloomsbury Square has long been an object of solicitude to me; and I trust that the present exhibition may ultimately result in such an institution, which we may hereafter consult with advantage and economy, and the origin of which we may pleasantly associate with this our agreeable visit to Nottingham.

The apparatus needs little descripton to those who have seen the model. It consists of a series of eight cone-shaped macerators, each provided with its receiver, and the water used for maceration is passed successively through the material divided amongst the eight cones—the material being reduced to a convenient state of pulverization, and each maceration being con-

tinued for such periods (varying from 1 hour to 12 hours) as may be appropriate to the character of the particular substances treated.

The advantage of this arrangement is that—with little more water than is required to moisten the whole—each of the eight portions receives eight successive macerations, which is sufficient to exhaust even such stubborn materials as cinchona bark. Other substances are exhausted with greater facility and, of course, require a correspondingly smaller quantity of water. If it is said that a similar result may be attained by a process of percolation in a single vessel, I can only reply that I shall be obliged to any gentlemen who will teach me how to avoid the practical difficulties of accomplishing this. I have utterly failed to do so, and out of these failures, and by successive steps, I have arrived at the present expedient, which, according to my experience, leaves nothing to be desired.

Subjoined is a table showing the results obtained from the treatment of 56 lb. of cinchona bark in the manner suggested. It is necessary to say that the progressive increase of density is sometimes affected by disturbing causes (*e. g.* the unequal duration of maceration in certain infusions which have stood all night), and that the success of the operation must be estimated by its general character, without expecting absolute uniformity in the intermediate stages.

Specific Gravity of Infusions recovered successively from Eight Macerating Vessels, each containing Seven Pounds Pounded Cinchona Bark.

	Quantity recovered.	Macerating Vessels.							
		1	2	3	4	5	6	7	8
1st Maceration	1½ gallons	1017·6	1026·0	1034·0	1040·5	1044·1	1052·2	1057·7	1060·5
2d "	1 "	1004·6	1012·0	1016·1	1020·3	1025·5	1028·2	1032·3	1032·0
3d "	1 "	1002·9	1006·7	1011·3	1013·6	1017·1	1021·3	1026·3	1029·3
4th "	1 "	1002·6	1005·0	1007·4	1010·0	1012·9	1014·2	1020·3	1021·5
5th "	1 "	1002·6	1003·8	1005·4	1007·7	1009·7	1012·0	1014·0	1016·5
6th "	1 "	1001·6	1002·3	1004·3	1006·0	1007·9	1009·9	1011·6	1013·3
7th "	1 "	1001·1	1002·1	1003·7	1005·7	1006·5	1007·9	1009·8	1010·8
8th "	1 "	1000·9	1001·8	1003·4	1004·2	1005·2	1006·3	1007·8	1008·0
Total	8½ "								

It will be seen that the exhaustion of the bark has been sufficiently effected with 8½ gallons of water in lieu of 84 gallons directed to be used in the instruction of the British Pharma-

cŏpœia (although a process of percolation is attempted in that case;) and, I may add, that this latter quality, if not actually adopted at Mr. Squire's suggestion, does at least coincide with his practical experience, *that cinchona bark cannot be adequately exhausted with less than twelve times its weight of water.—London Pharm. Journ., October*, 1866.

ACTION OF ALKALIES UPON THE FERRO- AND FERRICYANIDES OF IRON.

By William Skey.

Analyst to the Geological Survey, New Zealand.

It is generally set forth in those chemical works which treat upon these substances that "their color is instantly destroyed by alkalies," but from the results of a few experiments made upon them, it appears this statement requires some qualification.

Thus, if either of these compounds is treated with a very weak solution of caustic or carbonated alkali, the color thereof receives such an accession in its intensity as to rival the color of indigo blue.

If a solution of "Turnbull's blue" is employed, the change of color is very marked, while the solution keeps as clear as before. If used for writing purposes, it gives an intense blackish-blue ink on drying, and which is of some permanency; the addition of a certain quantity of ferricyanide of potassium affords a bright green ink.

Like the aqueous solution of basic Prussian blue, these compounds are precipitated from their solution by the addition of alcohol or soluble salts, especially if these have strong affinity for water.

It appears that the change in the intensity of the color is caused by the abstraction of a portion of the ferro- or ferri-cyanic acid, for if these compounds are repeatedly washed with water until nothing more is dissolved from them, the addition of the alkali in quantity only sufficient to produce these changes, immediately brings either of these acids into solution.

A great excess of carbonate of ammonia, by virtue of the

action it exercises upon the oxides of iron, dissolves these blue compounds, forming with them pink or red solutions, which, when spread upon paper, are at first almost invisible, but gradually darken if an excess of ferricyanide has been used. The final color is bright green.

These reactions appear both interesting and suggestive—interesting as affording other instances of indigo-blue-colored compounds of iron, to add to those of the tannate, gallate, and phosphate, and suggestive as intimating the possibility that in all these ferri- and ferro-compounds of iron the metal is in the same state of oxidation as it is in these other salts above alluded to.—*London Chem. News, Dec.* 14, 1866.

SYRUP OF THE PHOSPHATES OF IRON, QUINIA AND STRYCHNIA.

"Dr. Lyons has for some time past employed, with, he conceives, very important therapeutic results, this powerful tonic combination, for which the profession is mainly indebted to the late Dr. Eaton, Professor of Materia Medica in the University of Glasgow, and Professor Aitken of the Royal Victoria Hospital, Netley.

"This concentrated syrup of the phosphates is a perfectly clear and liquid fluid, slightly refracting light with the peculiar tint of the quinine solutions, and, viewed in mass, obliquely showing the bluish tint of the phosphate of iron held in solution. It is perfectly miscible with distilled water, has a strong styptic and distinctly chalybeate taste, and an aftertaste of quinine. It may be exhibited in doses of twenty to forty and even sixty minims, diluted with water, according to age and the circumstances of the case. It is well borne in the majority of cases; it acts as an invigorating stomachic, and sensibly improves appetite; it is an admirable general tonic; it appears to be a readily assimilable chalybeate, and is thus well adapted for certain chlorotic and anæmic states. In the morbid states of the nervous system which precede and accompany the development of the strumous diathesis, the influence of the strychnine salt appears to be exercised with great potency as a nervine, tonic and stimulant, and it would seem

to be an important agent in altering the morbid state of the nervous apparatus which presides over the function of nutrient assimilation. Physiologically, this influence may be supposed to be attributable to the well known action of the strychnine salts on the spinal cord, as well as by direct stimulus to the filaments of the great sympathetic plexuses distributed to the stomach and intestines. From the general tonic and invigorating effect of this drug, its influence on the stomach and promotion of appetite, as well as by the improved assimilation of food which it induces, it is a very valuable medicine in cases of strumous children threatened with scrofulous degeneration and ultimately with localized tubercular development. As a preparative to the use of cod-liver oil, and in certain cases as a concomitant to this food substitute, the syrup of the three phosphates will be found a very important adjunct in the treatment of numerous forms of strumous disease.

"But the employment of this admirable combination is not limited to the cases just mentioned. In depressed states of the system in the adult and the aged, in several of the conditions tending to adipose degeneration of important organs, such as the heart and kidneys, the syrup of the phosphates will be found a serviceable and reliable remedy. Where it is desired to combine a tonic and styptic to aid in checking the drain of albumen from the system in chronic disease of the kidneys, this combination will be found of great use.

"In Many forms of cutaneous diseases where a tonic effect is desired, this combination will be employed with benefit."

For the benefit of our readers we give the formula for the preparation of this valuable tonic, as obtained from the last edition of Dr. Aitken's "Practice of Medicine." This syrup (prepared by Neergard) is now in use in this city among many physicians, and is found to fully sustain the high commendation bestowed upon it by Drs. Aitken and Lyons.—[Ed. N. Y. M. J.]

"℞. Ferri sulph.,	. . .	ʒv.
Sodæ phosph.,	. . .	℥j.
Quiniæ sulph.,	. . .	grs. cxcii.
Acid sulph. dil.,	. . .	q. s.
Aquæ Ammoniæ,.	. . .	q. s.

Strychniæ,	. . .	grs. vi.
Acid phosph. dil.,	. .	℥xiv.
Sacchar. alb.,	. . .	℥xiv.

"Dissolve the sulphate of iron in one oz. boiling water, and the phosphate of soda in two oz. boiling water. Mix the solutions, and wash the precipitated phosphate of iron till the washings are tasteless. With sufficient diluted sulphuric acid, dissolve the sulphate of quinia in two oz. water. Precipitate the quinia with ammonia water, and carefully wash it. Dissolve the phosphate of iron and the quinia thus obtained, as also the strychnia, in the diluted phosphoric acid; then add the sugar, and dissolve the whole and mix without heat. The above syrup contains about one grain phosphate of iron, one grain phosphate of quinia, and one thirty-second of a grain of phosphate of strychnia in each drachm. The dose might therefore be a teaspoonful three times a day.

"The amount of phosphate of quinia might be increased according to circumstances; and if eight grains of strychnia were employed in place of six, as in the above, the phosphate of strychnia would be in the proportion of the one twenty-fourth of a grain in every fluiddrachm of the syrup. I would scarcely venture on a much larger dose. In case of delicate children, with pale countenances and deficient appetites, I have given, with great benefit, a combination of equal parts of the above syrup and of that prepared by Mr. Edward Parrish (of Philadelphia), often called Chemical Food. To children between two and five years of age, the dose of this combination may be a teaspoonful three times daily."—*Medical Press and Circular*, *June* 20, 1866, and *New York Medical Journal*, Feb., 1867.

Note.—Having had occasion to prepare this recipe, it was found to give a preparation answering the characteristics described, and which appears to be permanent. The amount of phosphate of soda is somewhat in excess, but as the commercial phosphate contains a variable quantity of chloride and sulphate the excess is of no detriment.

The amount of phosphate of iron ($2FeO,HO,PO_5$) is somewhat overestimated. The amount of syrup yielded is twenty-four and one-half fluidounces, containing about three-fourths of a grain of phosphate of iron to one fluiddrachm.

The manipulations are imperfect, and the following is suggested as

more satisfactory: Dissolve the iron and soda salts each in four fluidounces of warm water; mix the solutions; collect the precipitate on a paper filter, and wash with warm water; remove the filter from the funnel, and press carefully between folds of bibulous paper until no more water is absorbed by dry paper.

Having dissolved the sulphate of quinia in four ounces of water by careful addition of sulphuric acid, add a weak solution of ammonia, stirring constantly until a slight excess is added.

Collect the precipitated quinia on a paper filter, and proceed as with the iron salt. Both the precipitates will readily detach themselves from the wet filter without loss if the pressing is carefully done.

Dissolve the strychnia and quinia in 8 oz. of the phosphoric acid, and the iron salt in the remainder of the acid; mix the solutions; filter and add the sugar. CHAS. BULLOCK.

SEPARATION OF STRYCHNIA SALTS BY CARBOLIC ACID.

M. Paul Bert, (*Gazette Méd.*,) states that when a very dilute solution (1 grain to 4,500 grains) of muriate of strychnia in water is agitated with a few drops of carbolic acid, it assumes the appearance of an emulsion, and is then found to possess but very little energy when injected hypodermically. But this relative inocuity is due to a simple diminution of absorption, and not to a destruction of the strychnia by the carbolic acid, because, by removing the latter by agitation with ether, the solution becomes as limpid and poisonous as at first.

If this emulsion is filtered with care, and the filtrate treated with ether, it has no poisonous property; on the contrary, the part resting on the filter being suspended in water, and deprived of carbolic acid by ether, yields the strychnia first employed. The carbolic acid, therefore, possesses the property of suspending the salt of strychnia, and singularly facilitates its separation. M. Bert has not experimented on extract of nux vomica, but from what he has observed in regard to curara he thinks that the separation may be effected in the same manner, and that perhaps the process may have use in manufacturing. The author is also assured that strychnia can be also easily extracted from putrefying animal matter by the same means, so as to be useful in medico-legal medicine.—*Jour. de Pharm.*, Janv., 1867.

Varieties.

On "Glyconine"—a new Glycerole?—To obtain this compound, M. Edmond Sichel employs 4 parts (by weight) of yolk of egg, and 5 parts of glycerin, which he mixes simply in a mortar. It has the consistence of liquid honey, and is unctuous like the fatty substances, over which it has the advantage of being easily removed by water. It is unalterable, a specimen having been left exposed to the air for three years with impunity. Applied to the skin, it forms on the surface a varnish, which protects it from the contact of the air. These properties render it seviceable for broken surfaces of all kinds, particularly for burns, erysipelas, and cutaneous affections, in which it soothes the itching, and also for sore nipples; its harmlessness prevents, in the latter case, any interruption of suckling.—*Journal de Pharmacie*, September, 1866. Extracted from *Bulletin de Thérapéutique.*

Emulsion of Tar.—M. Jeannel recommends the following form for this preparation:—

Crystals of carbonate of soda .	.	1 part (by weight)
Wood tar	.	1 part "
Water	.	100 parts "

Mix the tar and carbonate of soda intimately in a porcelain mortar, introduce the mixture into a large flask containing the water, shake vigorously for several minutes, and filter. This emulsion mixes with water in all proportions. The quantity of tar cannot be increased advantageously by using a larger proportion of carbonate of soda, for the author finds that with two per cent. of carbonate of soda and of tar, a brown mixture is formed, which soon deposits a black fluid resin.—*Chem. and Drug.*, Dec. 15, 1866, from *Journal de Pharmacie.*

Solubility of Iodine in Tannin.—Iodine is known to be more soluble in water containing tannin than in pure water. M. Koller has found that to dissolve one gramme (about 15½ grains) in 450 grammes (about 14¼ oz. Troy) of water at 120° F., the latter must contain 3·29 grammes (about 50 grains) of tannin. By raising the temperature, the proportion of tannin may be diminished. Pure water dissolves more iodine than water containing sugar.—*Chem. and Drug.* Dec. 15, 1866, from *Zeitschrift f. Chemie.*

On Resins for Varnishes.—By M. Violette.—The resins, Calcutta copal and its congeners, as well as amber, which form the basis of varnishes, are not in their crude state soluble in ether, oil of turpentine, benzine, petroleum, and other hydrocarbons, nor in vegetable oils. They

become soluble when, by a preliminary distillation, they have lost 25 per cent. of their weight. This result, announced by the author in 1862, was the subject of a former memoir presented to the Academy of Sciences. The present paper contains some new researches, the conclusions of which may be stated as follows:—

1st. The above resins, when heated to a temperature of 350° or 400° centigrade (about 660° to 750° Fahrenheit) in a closed vessel, acquire, after cooling, the property of dissolving in the above liquids, and constitute excellent varnishes without any loss of material.

2d. When heated as above mentioned *alone*, or mixed with one or more of the liquids named, these resins dissolve perfectly in them, and constitute new and very fine varnishes.

3d. Calcutta copal resin, heated in this manner, with one-third of its weight of boiled linseed oil, and three quarters of its weight of oil of turpentine, gives at once, without loss, a thick varnish, clear, limpid, of a fine color, slightly yellow, quite fit for carriages and the most delicate interior and exterior house painting.

Resins, then, acquire new properties under the joint influence of heat and pressure: the latter rises as high as twenty atmospheres. This is a difficulty which manufacturers will have to solve in order to transfer this new process from the laboratory to the manufactory.—*Chem. and Drug.*, Dec. 15, 1866, from *Journal de Pharmacie.*

Silk Collodion.—The product of the silkworm has been reduced again by art, to the raw material or gum from which the insect spins its dainty fibre. A Frenchman, M. Persoz, fils, makes the discovery, using chloride of zinc as a solvent for the silk, and then separating the silk from the solvent by Prof. Graham's dialysis. This is a very simple process of filtration. A gutta-percha vessel with a parchment bottom receives the solution (diluted with water to the consistency of collodion), and is set upon the surface of water. The chloride of zinc percolates through the moistened parchment bottom, and mixes with the water; leaving the pure fiberless silk substance behind. For photographic purposes, it is iodized by mixing with an aqueous solution of iodide, and then dried and sensitized. The chloride, before using, is heated with a small quantity of oxide of zinc, to neutralize any excess of acid, and then filtered through fine linen to remove the residuum of the oxide. For a prompt solution, the chloride is kept warm. The separation, to be entire, occupies a few days. —*Drug. Circ.*, Feb., 1867, from *Scientific American.*

Modified Donovan's Solution. — (Gazette Hebdomadaire, 3 Aout, 1866.) The formula for Donovan's Solution has been modified in various ways, and it is, perhaps, in part due to this circumstance that we must attribute the want of uniformity in the results obtained by the use of this preparation. It is difficult to say to which one of these preparations we

should give the preference, or by the aid of which one we can obtain the most satisfactory results. M. Pedrelli (Giornale Italiano delle Malattie Veneri et Bulletin de Therapeutique), physician to the Hospital of St. Ursula, at Bologne, recommends the following formula, which has in his hands produced most excellent results in various diseases of the skin (obstinate syphilides, lupus, etc.):—

Iodide of arsenic, 20 centigrammes;
Distilled water, 120 grammes.

Dissolve in a glass vessel by the aid of heat, and add

Biniodide of mercury, 40 centigrammes;
Iodide of potassium, 3 or 4 grammes.

Filter and preserve in a well stoppered and colored glass bottle. The liquor thus obtained is clear, and has a light, pale tint. Four grammes of this preparation contain about six millegrammes of iodide of arsenic, and twelve of biniodide of mercury. The dose which he administers varies from four to one hundred drops, given in distilled water, three times daily. He increases the dose each day by one or two drops.—*N. Y. Med. Journ.*, Feb., 1867.

Capsicum in Dèlirium Tremens.—(Medical Press and Circular, April 18, and June 20, 1866.) Dr. Lyons urges the use of capsicum in from twenty to thirty grain doses in the invasive stages of delirium tremens. He administers it either in bolus or capsules. A simple dose sometimes produces profound and refreshing sleeps and thus cuts short the disease. Several cases are narrated, showing the beneficial efficacy of the drug when thus used. As capsicum belongs to the great order of the Solanaceæ, Dr. Lyons suggests the possibility of its containing a narcotic principle hitherto undiscovered.—*N. Y. Med. Journ.*, Feb., 1867.

The Preservation of Sulphate of Iron.—(London Lancet, June 9, 1866.) Signor Pavisi recommends the following method of preserving sulphate of iron from oxidation. Mix four parts of pure crystallized sulphate of iron, and an equal quantity of finely powdered gum arabic, with distilled water, and evaporate the solution in a water bath, at a low heat, till it has a sufficient consistency to be poured out on plates of glass. When it has been poured out in this way and allowed to dry at a temperature of 30° Cent. in the dark, it may be cut up into lozenges, which can be kept for any length of time in a colored stoppered bottle. A further account of this method is published in the *Tijdschrift voor Wettenschapplijke Pharm.*—*N. Y. Med. Journ.*, Feb., 1867.

A Permanent Mass for Pilula Ferri Iodidi.—(The Medical Press and Circular, June 6, 1866.) Iodide of iron being so unstable when exposed to air, Mr. Gross proposes the following form for a permanent pill-mass, which may be prepared extemporaneously:—

Take of Iodine	40 grains.
Reduced iron.	
Powdered acacia—āā	10 "
Powdered sugar	20 "
Glycerin	15 drops.
Powdered althæa	q. s.

To be made into 50 pills.

Triturate the iodine and the iron thoroughly together, dry, until they are reduced to a fine powder; then add the glycerin, and rub till the fumes of iodine cease to be given off, and the mixture assumes a greenish color. Then add the acacia and sugar, and, lastly, sufficient powdered althæa to bring to a pilular consistence.

The mass should be very stiff. When the pills are formed roll them in ferri pulv., and then coat them with tolu.—*N. Y. Med. Journ.*, Feb., 1867.

Sirop de Pepsine and Crême de Bismuth.—By L. Ch. Boisliniere, M. D. —I communicate my formulæ for the two following preparations:—

Sirop de Pepsine.

℞ Boudalt's pepsin, ʒijss.
Distilled water, ℥iv.
Sherry wine, ℥iv.

Mix the pepsin with the water and sherry, and digest four hours, at a temperature not to exceed 85° F. Then add—

Syrup of strawberries, ℥iv.
Tinct. Cardamom comp., ℥iv.
Carmine, grs. ij.

Digest and filter. Each tablespoonful contains five grains of pure pepsin.

Dose.—One tablespoonful immediately after every meal.

Crême de Bismuth.

℞ French Subnitrate of Bismuth, ʒijss.
Mucilage of gum,
Syrup strawberries, each ℥ij.
Essence Vanilla, gtt. xxx.
Carmine, grs. ij.

M. S.—Shake vial and take one teaspoonful three times a day, before every meal. Each teaspoonful contains five grains of the subnitrate of bismuth.

St. Louis, Nov. 16, 1866.

—*Richmond* (Va.) *Med. Journ.*, Feb., 1867.

Union of Mercury and Aluminium.—By Dr. Thomas H. Chandler, Boston.—A remark by Dr. McQuillen, in the December number of the

Dental Cosmos, on the "Stone-knife," that "the serrations become clogged with gold," reminds me to say that the serrations of our instruments are usually made on a wrong principle. They are made with a fine flat-sided knife-shaped file, instead of with a file with curved sides. The former will always clog, the latter never. While writing, I will mention a very curious effect of mercury on aluminium, which I noticed accidentally some time ago. The books tell us that they will not unite, but I undertook to polish a piece with a buckskin, which had been in use for a long time for squeezing the mercury from amalgam, and was surprised, while holding the aluminium in my hand, to notice a great heat which was developed from it. On looking at it closely, I was still more astonished to perceive a remarkable efflorescence, like the mould on old cheese, springing up and growing visibly to the naked eye. I pursued the experiment for more than an hour, with the same result. Thinking that perhaps it might be something beside the mercury which induced the result, I took a clean piece of felt, and placed some mercury upon it, wetting it, and breaking up the globules into fine particles with my finger, and rubbing them well in. Upon rubbing the aluminium with this, the same result was again produced. Under a magnifying-glass the effect is very fine. The piece of aluminium which I used was one which had been through the vulcanizer, under Fowler's process. It is just possible that the sulphur may have had something to do with the phenomenon.—*Dental Cosmos*, Feb., 1867.

A Superior Glue.—A very superior glue may be made by dissolving three parts of India-rubber in thirty-four parts of naptha. Heat and agitation will be required to readily effect the solution. When the rubber is completely dissolved, add sixty-four parts of finely powdered shellac, which must also be heated in the mixture until all is dissolved. This mixture may be obtained in sheets like glue, by pouring it, when hot, upon plates of metal, where it will harden. When required for use it may be simply heated in a pot till soft. Two pieces of wood or leather joined together with this glue can scarcely be sundered without a fracture or tearing of the parts.—*Drug. Circ., Jan.*, 1867.

Welding Mixture.—Mr. William A. Sweet, of Syracuse, says in the *Scientific American:* "I send you a recipe for using on cast steel in welding, and in restoring burnt steel. It is the best preparation that I have ever seen or used. One and a half pounds of borax, half a pound of sal ammoniac, quarter of a pound of prussiate of potash, one ounce of rosin, one gill of alcohol, and one gill of water. Pound fine, and boil in an iron kettle slowly, until it becomes a thick paste. Use as borax.—*Ibid.*

Spongy Platinum.—The following method is recommended for preparing spongy platinum: When sal ammoniac is added to a solution of plati-

num in aqua regia, a precipitate consisting of the double chloride of platinum and ammonium is formed. If this double salt be heated to redness, its volatile constituents escape into the atmosphere and leave the platinum behind in porous and slightly adherent masses—as spongy platinum, in fact.—*Journal of Applied Chemistry.*

Porosity of Caoutchouc.—M. Payen states in *Comptes Rendus* that a microscopic examination of thin sheets of caoutchouc discloses minute holes or pores, which are rounded, and communicate with each other. Contact with liquid makes these pores more distinct. Vulcanized India-rubber exhibits narrower cavities and concentric circles spreading from one pore to another, showing successive zones of diminishing action of the sulphur. By exposure to water the caoutchouc becomes whiter and opaque through absorbing the fluid. M. Payen considers this porosity to be concerned in the dialytic action of India-rubber on gases discovered by Professor Graham.—*Intellectual Observer.*

Science in the Dairy.—There are many dairymen who persist in thinking it a foolish whim, that the milk last drawn from the udder of a cow contains more cream than the first obtained. Yet careful analyses have fully proven the correctness of the assumption. Schubler says the milk last drawn contains three times as much cream as that first procured. Dr. Anderson, in "Dickerson's Practical Agriculture," asserts that he found, by actual analysis, in one instance, that the last cup of milk drawn from the udder contained *sixteen* times as much cream as the first cup. The separation of cream from the milk takes place, in part, in the udder of the cow, particularly if the cow is suffered to stand at rest for some time previous to milking.

The exercise required of a cow that is driven a considerable distance, just before being milked, causes an increased play of her respiratory organs. The excess of oxygen thus respired unites with a portion of the butter, of which the cream is largely composed, and consumes it. The same is the case when a cow is harassed, or in any way seriously annoyed, just previous to being milked. It should be a great care of all dairy farmers, to keep their cows as free as possible from every kind of annoyance, and thus prevent them from inhaling an excess of oxygen.

The animal heat evolved in the consumption of an excess of oxygen, more than is sufficient to act properly on the blood, besides destroying the cream, also decreases the volume of milk, and elevates the temperature of the same to such an extent that acetous fermentation is induced, which cannot be arrested even after the milk is taken from the cow; hence the milk is diminished in richness, and speedily becomes sour. For the above reasons stall-fed cows, as a general thing, give richer milk than those suffered to run in the fields. For the same reason morning's milk is richer than night's milk. The quietness of night is favorable to the formation and

preservation of cream. Repeated analyses have proven all the above facts. There is more philosophy in the dairy business than most people are aware of.

There are so many changes which are constantly occurring to the dairyman that cause variations in the value of his milk, even when the conditions of feeding are the same, as to render a chemical knowledge, or at least ready access to chemical experiments in this direction, of the most economic and practical importance. It is true that the animal body is not a mere chemical laboratory, in which the chemist may operate as he pleases; for there is a power there—a vitality superior to his science; but by his intelligent concurrence with, and proper regard for that vitality, the changes and conditions which he desires can very generally be effected.—*Druggists' Circular, Jan.* 1867.

Editorial Department.

School of Pharmacy.—We are informed that the class of candidates for the Diploma of the Philadelphia College of Pharmacy is much larger than ever before, and that the commencement ceremonies are to be held in the Academy of Music, which has been engaged for the occasion, which is always one of great interest to the junior members of our profession.

Erratum.—In the editorial note at page 473, Sept., 1866, read "vol. xxiv.," instead of "vol. xxxiv.," as there printed in the notice of American Opium Culture.

Paris Exposition.—The time for this great exhibition of the products and manufactures of all nations is rapidly approaching (to open April 1st), and already we hear of many preparing to visit Europe, under the stimulus of seeing this grand collection of interesting objects. Much has been said about the difficulties of accommodation to visitors, high prices, etc. We cannot but believe that the authorities have not been unmindful of what is required to meet the emergencies in the way of provision and accommodation; and whilst living will probably be higher than at ordinary times, the European plan of paying for lodging and board as separate items will enable persons to regulate their expenses to a very considerable degree by the depth of their purses. The following extract from the *Chemical News*, of London, exhibits a novel plan of visiting Paris by the thousand, at fixed times and rates for the excursion:

Visitors to the Paris Exhibition.—Probably many of our readers have determined to visit Paris during the time of the International Exhibition. It may not have occurred to such that arrangements for such visits should be made at once, beforehand, but we would press upon all the necessity of making them

as soon as they can. The tradesmen and hotel-keepers of Paris are promising themselves a golden harvest, and there is little chance of any arrangement being made with them, unless combined action be at once set on foot. For workmen we are afraid the visit will be impossible, so high will be the prices for accommodation. From inquiries that we have made, the following seems most feasible, and may be carried into effect if time be not lost. Mr. Thomas Cook, the well-known excursion manager, has obtained reliable assurance for the accommodation of 1,000 or more visitors at a time from April to the end of October, at the nearly uniform rate of 10s. a day, for bed, meat breakfast, dinner at *table d'hôte*, and lights, a small charge being added in some cases for service. By a regular succession of visitors in the full numbers, this reasonable scheme may be carried out. We recommend this plan to those who propose a visit to Paris, since we do not think they will obtain such good terms by private contract—either singly or in parties.

Laritz Fir Wool Manufactures and Preparations are among the novelties of medicine. They consist of, first, the essential oils of the leaves of fir and pine trees, common in Germany, called fir wool oil; second, fir wool extract; and, third, fir wool clothing and wadding. The oil is made by distilling the fir leaves with water, in the ordinary way. It is a terebinthinate oil, with a pungent, rather agreeable odor, resinifies on exposure, like oil of turpentine, and varies in specific gravity from 876 to 912, according as it is made from pine or fir leaves. It is used generally as an external application, either as embrocation, or applied by wadding, about 3 teaspoonfuls at a time. Internally, the dose is 15 to 20 drops. It is used in gout and rheumatism, dropsy, paralysis, and chronic skin diseases.

The extract is the result of evaporating the watery decoction of the leaves, and is used as an addition to the warm bath.

The clothing and wadding are probably made from the fibrous material of the leaves, spun and woven, and from possessing a certain mechanically irritating quality of a gentle flannel-like character. We know nothing of the merits of these articles as therapeutic agents.

F. W. Clemenz, M. D., of Rodolstadt, Germany, is the introducer of these articles; Aschenbach & Miller, of Philadelphia, the agents.

Proceedings of the American Pharmaceutical Association at the Fourteenth Annual Meeting, held in Detroit, Mich., August, 1866. *Also the Constitution and roll of Members.* Philad., 1866, pp. 316.

The volume of Proceedings of the Association was received too late for notice in our last number, although the Editor, Prof. Maisch, in granting us the courtesy of extracting some of the papers for publication from advanced sheets, fully expected to have received it from the printer in time for notice. The portions of the papers not heretofore noticed are,—the report on the Internal Revenue Law, by Dr. E. R. Squibb, of about 50 pages; the report on the Progress of Pharmacy, by Mr. Enno Sander, of about 60 pages; and the contribution to a report from the Pharmacopœia Committee, also by Dr. Squibb, which we print in the present number,

(see page 129.) The report on the Progress of Pharmacy, which was not produced at the meeting, and which we here see for the first time, is arranged much in the usual manner:—a chapter on new publications, Pharmacy, processes and apparatus, powders, distilled waters, extracts, tinctures, syrups, pills, cerates and miscellaneous preparations. Materia Medica, arranged under the natural orders. Chemistry—inorganic, organic and analytical. In many instances Mr. Sander has extended his notices so as to add much to the interest of the report, which usually has been confined to an enumeration of papers and subjects. Many recipes are given and, whilst the report is not as extended as some that have preceded it, the very sufficient reasons of Mr. Sander, viz., the prevalence of epidemic cholera and personal indisposition, render it a wonder that so much was accomplished so far from the literary sources of the materials which supply the facts.

Reflecting upon the liability to a recurrence of this difficulty and consequent disappointment of the Association in future, Mr. Sander suggests the appointment of a *permanent Reporter on the Progress of Pharmacy*, and remarks:—

"It appears that very few members are so entirely independent that they would be able to disregard their own business relations when they come into collision with their duties towards the Association; but a permanent reporter, who constantly receives the new publications immediately after their issue, will be enabled to completely organize his labor and adopt such a system that accidents will not much disturb him, and a failure be rendered almost an impossibility. If selected from the number of our members who devote themselves much to study and to the development of the pharmaceutical sciences, the reporter would even not feel the increase of his labors, he would incorporate them into regular studies and thus be enabled to improve and turn to advantage the experience gained during his studies. Besides, the regular issue of such a report by one and the same member, would not fail to attract the attention of booksellers and publishers, who would eagerly embrace the opportunity of having their publications brought to the notice of the profession through a medium which is sure to reach every person in this country, who has any interest in the advancement of scientific pursuits."

The importance of this suggestion merits the earnest consideration of the Association, The reporter should have access to a greater variety of periodical literature than is likely to reach the Association in exchange, and besides the report should be as close to the time of meeting as is possible.

The book as a whole is a decided improvement on that of 9865 in its contents and mechanical execution. The Permanent Secretary has done his work well and the volume is a credit to the Association. The price fixed upon by the Executive Committee is $1.20 in paper and $1.50 in cloth binding. The Committee also call attention to the back volumes.

The whole set from the beginning may be had for twelve or thirteen dollars, and those who desire them should attend to it soon before they are out of print.

Burgoyne, Burbidges & Squire's Monthly Price Current, 16 Coleman Street, London. Established A. D. 1741; pp. 16, folio.

For some months past this extraordinary circular has been received at our office, and, as a curiosity in its way, we may notice its contents cursorily. The firm are wholesale druggists, and dealers in everything appertaining to a druggist's wants, including drugs, chemicals, oils, glassware, paints, dyes and sundries, instruments of all kinds, medicine chests, etc. The circular is closely printed on thin tissue writing paper, each page being 16 by 20¾ inches, in columns, and priced. The editing this circular intelligently must involve a great amount of labor and business talent. At the bottom of the last page are two columns, exhibiting, first, articles which are higher in price than last month; second, articles which are lower in price than last month. These enable the consulter to ascertain, without going over the whole circular, the most important changes.

Braithwaite's Retrospect of Practical Medicine and Surgery, Part LIV., January, 1867. New York: W. A. Townsend publisher; pp. 304.

This semi-annual has been received from the publisher. It contains the usual digest of the important papers of the medical journals, more especially of the English journals.

Special Notice.

Dr. Otto C. Berg died at Berlin, on the 20th day of November, 1866, after an activity there of more than twenty years, as professor of botany and pharmacognosy. As teacher and author, and through his noble character, he has secured for himself the esteem and love of all who had the pleasure of knowing him. The circle of his pupils and his admirers is therefore very large, and his early death is deeply felt, not only at the scene of his labors, but wherever science is cultivated.

In accordance with the expressed wish of his friends and pupils, to pay a lasting tribute to the memory of the departed, by erecting a monument over his tomb, at the Dorotheenstadt Cemetery, as has been done to his former colleagues, Lintz, Ritter, Enke, J. Müller, Mitscherlich, and H. Rose, a committee has been organized at Berlin to collect the requisite funds. For the purpose of affording an opportunity to his former pupils, friends and admirers to aid in this undertaking, the undersigned beg to inform them that they are willing to receive contributions, to forward the same to the Central Committee at Berlin, and to account therefor at the proper time.

Dr. Fr. Hoffmann, 243 East 10th Street, New York.
Rob. Wendler, 370 Atlantic Street, Brooklyn.
J. M. Maisch, 1607 Ridge Avenue, Philadelphia.

OBITUARIES.

Otto Carl Berg was born at Stettin, Prussia, August 15th, 1815, where his father was located as physician and medical counsellor. He was the fourth among seven brothers, and lost his father when in his seventh year. He was educated at the private school of Rev. Bindemann, at Neuendorf, and afterwards at the Stettin Gymnasium (classical school). From 1831 to 1835 he served his apprenticeship at Demmin, where he devoted the early morning hours to collecting and examining plants. After passing his examination as clerk (Gehilfe), and serving as such in several places, he went to the university of Berlin in the spring of 1838, and in June, 1839, passed the State's examinations as apothecary, when for about a year after the laboratory of the "Pelican" pharmacy in Berlin was under his charge.

Being without means and without prospects to establish himself, he concluded to devote himself exclusively to botany, and while continuing his studies gained his livelihood by preparing young pharmaceutists for the state examinations, commenced his Handbook of Pharmaceutical Botany, and prepared himself for matriculation at the University of Berlin, where he absolved his three years' studies in 1845, in which year the first edition of his "Handbook" appeared in print.

In 1848 Berg was promoted by the philosophical faculty, and established himself in 1849 as private lecturer on pharmaceutical botany and pharmacognosy. After the death of Professor Link, the eminent botanist, who had been his warm friend, he became a member of the examining committee, and continued to work in both spheres to his death.

As a teacher he was clear and objective, and excellent in diagnosis; as a man he was noble and good, grave in consequence of the cares of his early life and his unceasing labors, but modest and cheerful in his intercourse. A short journey during the summer holidays excepted, he was engaged throughout the year with his lectures and private instructions, from early in the morning until 7 or 8 o'clock in the evening. During the summer the Sundays were devoted to botanical excursions; in winter to microscopical examinations of botanical objects; the large number of his pupils were then admitted in groups for one hour each.

Besides numerous essays published in journals he issued the following works, copiously embellished with microscopical drawings executed by himself: Handbook of Pharmaceutical Botany (five editions, 1845–66); Pharmacognosy (three editions, 1851–63); Characteristics of the Genera of Officinal Plants (two editions, 1848–62); Representation and Description of the Officinal Plants (in 34 parts, 1853–64); Anatomical Atlas of the Cinchona Barks contained in the Cabinet of the University of Berlin (1864); Monograph of the Myrtaceæ of Brazil, and the unfinished results of nine years' labor: A Monograph of the Melastomaceæ of Brazil. He was also co-laborer and author of the botanical and pharmacological parts

of the Seventh Prussian Pharmacopœia, and of the recently completed Pharmacopœa Germanica.

Dr. Otto Carl Berg died on the 20th of November, 1866. By his death one of the largest Universities in the world lost one of its most prominent teachers, and Science one of her most zealous and devoted scholars, who, by faithful and unceasing labor among discouraging circumstances, became a lasting ornament to science, and to the profession of pharmacy in particular.

Ed. François Frémy, a venerable French Pharmacien, died at Versailles, on the 10th of November, at the age of 93 years, in the full possession of his mental faculties. He was born at Auxerre on the 20th of Sept., 1774, entered the republican army in 1792, and in 1797 returned to Paris, where finding M. Courtois, (who afterwards discovered Iodine,) a pupil of his father, engaged as preparateur in the laboratory of M. Fourcroy at the *Ecole Polytechnique*, he was invited to join him, and for two years M. Frémy remained in that service, where he gained the friendship of Fourcroy and Thenard. Soon after, he entered the laboratory of Séguin, a chemist who had acquired much wealth by conducting the tanneries for the supply of leather to the army in the early days of the Republic, and who being ambitious to acquire a scientific reputation, established a large laboratory at Jouy, and Courtois and Frémy were admitted. These two friends passed four years in this laboratory, and it was during this time, and under the immediate labors of Courtois, that the investigations on opium, which resulted in the discovery of the substance now known as morphia, were made, and the memoir containing all the investigations of Courtois was read by Séguin before the Institute on the 24th of Dec., 1804, and subsequently printed under his name in the *Annales de Chimie*. When afterwards Sertuërner discovered the true nature of and gave the name to morphia, Vanquelin sought to reclaim for Séguin the priority of the discovery. After three years here he commenced lecturing gratuitously on chemistry to the junior students and to physicians, some of whom, to testify their sense of his disinterested kindness, offered to purchase a Pharmaceutical shop for him at Versailles, which, by the advice of Thenard, he accepted, the latter aiding him with funds. This Pharmacy became afterwards the most celebrated in Versailles. We have not space to follow the subsequent career of M. Frémy, but will merely state that in 1811 he was appointed by Napoleon to the Military School at St. Cyr. He conducted a private analytical laboratory, was much engaged in medico-legal and agricultural chemistry; in 1834 he was made Chevalier of the Legion of Honor and became an officer in 1859. M. Frémy has left two sons, both of whom are well known in science. The city authorities of Versailles testified their appreciation of his worth and standing by tendering him funeral honors.